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EDITORIALS

AID FROM THE AMATEUR . . . In expressing my appreciation to the Society for American Archaeology for the honor it has done me in selecting me for the office of Vice-President, I should like to voice a few thoughts, trite and hackneyed though, possibly, they may be.

I hope that the Society and its journal will never lose the attitude that they are the mediums between professional and non-professional archaeologists, and will never become merely the organization and trade journal of the professional; the common touch must be kept. Probably few of our members are in the strictly amateur-collector category, and some may feel fed-up with the constant holier-than-thou preachings counseling reticence and care in excavations, and the adoption of accepted professional techniques, practices and ethics. The assumption of superiority on the part of some professionals is often galling and discouraging to the amateur. Every student knows how annoying it is to have to drop a job of interesting research to convince (?) a visitor that his queer-shaped pseudomorph is not a moccasin-last, or to read and answer a four-page letter on the Atlantean origin of the Talligewi; but by failing to accord due meed to the visits and letters of non-professionals we run the risk of missing some revolutionary discovery or idea. The history of every science is replete with instances of non-professionals with brilliant and belatedly accepted theories or data who met with curt treatment or rebuffs for a long time before finally receiving a sympathetic hearing. Many complain of the way that their letters are answered by brief acknowledgments or ex-cathedra pronouncements.

Hardly any theory of archaeology is so well grounded as not to be susceptible of controversy, by a proved discovery of even the veriest tyro. Though in the nature of the science the professional may always claim that not all of the data have been noted or all possible alternative theories considered (See: Transportation by Migratory Animals. Am. Anth., N.S., 36:314–315, April–June, 1934). I am reminded of the scientific reactions that are said to have ensued when Marconi announced that he had communicated across the Atlantic by wireless. A reporter

interviewed the physics department of a large university. "Impossible!" exclaimed the young instructor; "We have proved mathematically and physically that it can't be done!" "It is contrary to all calculations and theories," said the old head of the department, "but if Marconi says he did it, we'll have to find out how to explain it." And soon they did.

In archaeology many valuable contributions have been made by amateurs, some of whom later became professionals. This is especially true in such fields as Maya epigraphy, astronomy, and mathematics, where field work is unnecessary. Goodman, a retired farmer, who contributed as much to our knowledge in this line as anyone, piles contempt upon the heads of the professional students of his day, most of whom apparently gave his theories scant consideration. He calls them "Shoe-string" scientists, because one, when he sent him a drawing which combined glyphs and a human figure, replied that Goodman had drawn the sandal-string between the wrong toes! Let not us of the modern generation lay ourselves open to such excoriation by reason of cavalier supercilious treatment of non-professionals and beginners.

Yet even the constant sermonizing on proper methods in archaeology does not always bear fruit. The cataloguing of collections, like testaments and life insurance, is something that one is prone to postpone for more interesting labors until death says "too late," and the scientific value of the collection is lost. Even if every reader has heeded the gospel, has his private collection properly documented and his scientific soul saved, most of us know other owners who have not heard or heeded the evangelistic tidings. How about a little missionary work in such stiff-necked instances, even if it requires one's personal assistance? Only a few months ago I made a long trip to see the famous collection of an elderly man who has published a number of books of international reputation on archaeology. It contains exceptional material, but to my distress is absolutely uncatalogued. He thinks he knows where every piece came from, though even now some are uncertain, but in a few years no one will know, and the collection will have lost most of its value for other archaeologists. Unfortunately I could not give the time to work upon it.

One final thought I wish to leave with my non-professional colleagues. *You* can become the archaeological authority on your township or county. Your knowledge will be welcomed and incorporated in scientific literature, and your data will aid in filling out the great picture; but if you wish merely to have in your collection a beautiful tiny bird point of obsidian from Washington, a genuine Folsom point from New Mexi-

co, or a pretty piece of Maya jade, you are just another souvenir collector. Archaeology needs data on every portion of the land, and especially on the places where little work has been done because the finds are unspectacular. A few years ago I was overjoyed at receiving a communication on archaeological matters from a man in a small town in an archaeologically unknown region of northern Mexico. After answering his query, I hopefully inquired for information on a reported site only a few hours' journey away. To my disappointment he replied that he had never been there and was not interested; but what information could I give him on Maya astronomy? He could have afforded invaluable information on the archaeology of that region, but without a large library could do little on the latter subject. Still, I suppose he had to follow his interest; it was that or nothing, and he may turn out to be another Goodman.

So don't listen to the call of the distant exotic; the professional has more data at his disposal and can do it better.

"Ah! Take the cash in hand and waive the rest
Nor heed the music of a distant drum."

J. ALDEN MASON, *Vice-President*

MIGRATORY RECORDS . . . Your copy of this journal can hardly be expected to find you within a reasonable length of time after it is off the press unless your present correct address is known to the Secretary. You will be doing yourself a great favor and saving the Society extra postage if you keep the Secretary informed as to geographical and temporal factors involved in the pursuit of your migratory habits.

W. C. M.

A PERSPECTIVE OF NORTHEASTERN ARCHAEOLOGY[30]

WILLIAM A. RITCHIE[31]

INTRODUCTION

ARBITRARILY considered, the Northeastern geographical area embraces the Maritime Provinces of Canada, lower Quebec and Ontario (exclusive of the peninsula), and all of New England, New York, Pennsylvania and New Jersey. Obviously such a large territory (some 485,000 square miles) constitutes neither a single physiographical nor cultural province, but in a general way it was the domain, in both historic and prehistoric times, of two far flung ethnic groups: the Algonkian and the Iroquoian.

The archaeological background of the numerous Algonkian groups is virtually unknown; for the Iroquois, correlations have been well established between the prehistoric and historic occupations, through the intervening protohistoric period, owing to their recency and the relative abundance of documentary evidence.[32] Two main causes serve to explain the deplorable lack of cultural data for the Algonkian tribes: rapid acculturation under European influence and the destruction of the principal aboriginal sites by intensive Caucasian settlement of the coastal plain and eastern river valleys.

Much sporadic and some systematic field work over practically the whole Northeastern area during more than half a century has resulted in a large literature, but in few accounts of a general nature.[33]

While no archaeological culture in the entire Northeastern area is in any sense thoroughly understood, a few have been relatively well elucidated and will form the framework of this account. Research now in

[30] Condensed from a thesis submitted in partial fulfillment of the requirements for the M.S. degree, May, 1938. Read in abstract at the annual meeting of Society for American Archaeology, Milwaukee, May 14, 1938.

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[32] Among the most important of these may be mentioned: The Jesuit Relations and Allied Documents, ed. by Reuben Gold Thwaites, 73 Vols., Cleveland, 1896–1901; Documents Relating to the Colonial History of the State of New York, 15 Vols., ed. by E. B. O'Callaghan and B. Fernow, 1853–1887, Albany; Champlain's Voyages to New France, Eng. trans. by Champlain Society, Toronto, 1922; The Voyages of Jacques Cartier, Eng. trans. by H. P. Biggar, Pub. by Public Archives of Canada, No. 11, Ottawa, 1924; History and General Description of New France, by P. F. X. de Charlevoix, Trans. by J. P. Shea, 6 Vols., N. Y., 1866–1872; Exploration of the Great Lakes, 1669–1670, by Dollier De Casson and De Brehant De Galinee, Trans. and ed. by James H. Coyne, Pt. I, Ontario Historical Society, Papers and Records, Vol. IV, Toronto, 1903.

[33] Parker, 1920; Willoughby, 1935.

progress in nearly every state probably will do much to illuminate penumbral horizons. A safe prognosis, even in this long explored area, is the appearance of new culture entities now unknown or only suspected. It is doubtful whether an absolute dating of the older occupations can ever be achieved in this region, at least on a dendrochronological basis, owing to the scarcity of datable wood, but a relative chronology and culture sequence, like that already partly worked out for New York (Table 1) will follow the discovery of rare stratified sites and careful analysis of typology. The possible aids of soil profile studies and pollen analysis have not yet been enlisted in this area, to the writer's knowledge.

Since New York State occupies virtually the heart of the region, has been the scene of the most sustained and detailed exploration, and its prehistory is consequently more thoroughly known, it may serve as a logical nucleus for the following concise analysis of Northeastern culture complexes. Manifestations not represented in this state will be discussed, insofar as knowledge permits, with reference to their respective relations to the typological sequence for New York. At best this treatment of a complex field purports to be but a preliminary effort at comparison and correlation, and the manifest discontinuity arising from incomplete data is further amplified by the emphasis upon factual evidence rather than theoretical speculation.

THE IROQUOIS ASPECT

If we are correct in assigning the Iroquois culture to the Mississippi Pattern, to which, in terms of Deuel's analysis of basic cultures, only half of its traits pertain, the remainder being Woodland, on the same basis of comparison,[34] there are then represented in the Northeastern area the three basic patterns thus far recognized, viz., the Mississippi, Woodland, and Archaic.[35] Here, as in the Great Lakes area (Illinois,[36] Iowa,[37] and Wisconsin[38]), the Mississippi is the most recent.

[34] A comparison of Iroquois culture with Deuel's (1935) summary of 23 ranking Mississippi and Woodland traits (pp. 436–437), shows an agreement with 11 in the first and 12 in the second series, viz. Mississippi—I 1; II 2; III 1; 2 a, c, e; 3 a, b; 4; 5 ("clay pipes common" only applies); 6 b; Woodland—I 2; II 1, 3, 4; III 2 b, d; 3 b; 6 a, c, d, e, g.

[35] See: The Indianapolis Archaeological Conference, National Research Council, Division of Anthropology and Psychology, Committee on State Archaeological Surveys, Washington, D. C., 1937.

[36] Cole and Deuel, 1937, pp. 199–206.

[37] Keyes, 1934, pp. 346–348.

[38] McKern, by correspondence.

TABLE I

CLASSIFICATION OF ABORIGINAL CULTURES OF NEW YORK STATE[39]

Pattern	*Phase*	*Aspect*	*Focus*	*Component*
Mississippi	Upper	Iroquois	Huron Neutral Erie Seneca Cayuga Onondaga Oneida Mohawk Tuscarora Andaste	Various sites in N. Y., Ontario and Pa.
————	Hopewellian	————	New York	Geneseo Squawkie Hill
Woodland	Northeastern	Owasco	Castle Creek	Bainbridge Castle Creek
			Canandaigua	Canandaigua Levanna Owasco Lake
		Vine Valley	Point Peninsula	Jack's Reef Rene Menard Bridge West Rush Avon Pt. Peninsula
			Middlesex	Orwell, Vt. Swanton, Vt. Vine Valley Palatine Bridge
		Coastal	"Late" "Early"	Various sites in s.e. N. Y. and N. J.
			Orient	Southampton Orient
		Laurentian	Vosburg	Vosburg, etc.
			Vergennes	Vergennes, Vt.
			Brewerton	Smoky Hollow Oberlander Robinson
Archaic	————	————	Lamoka	Woodchuck Hill Geneva Lamoka Lake

[39] These are arranged in convenient order and not entirely in historical sequence (see text).

In briefest outline, the salient criteria of prehistoric Iroquois culture may be enumerated as follows: rectangular, semi-permanent house type; flexed, bundle and ossuary burial in cemeteries; grave goods very rare and when present consisting usually of pipes, tubular bone beads, a few cylindrical shell beads, bone awls, stone celts, stone adzes, arrow-points, and (very rarely) pottery;[40] high development of ceramic and bone industries; projectile points predominantly simple, small, isosceles triangles, made from spalls; pottery and stone pipes of trumpet type; conoidal or vase type stone pipes (most common among western Iroquois); and grit-tempered, well levigated and fired pottery vessels of globular shape with rounded bases and constricted necks. The pottery usually is equipped with thickened rims or definite collars, commonly bearing rim points or castellations, and having circular or rectangular mouths. The body is prevailingly smooth but is sometimes corrugated by means of a fabric or cord-wrapped paddle. Decoration is commonly confined to the neck and rim or collar, and consists of simple triangle complexes, usually the chevron, applied by incised technique. Notching at the base of the rim or collar is a usual treatment.

Negative elements of Iroquois culture include burial mounds, cremation, copper artifacts, discoidal stones, the gouge, grooved axe, plummet, and the slate problematical forms.

According to Skinner,[41] two main groups of the Iroquois may be differentiated on cultural grounds, viz., the western group, consisting of the Neutral, Huron, Tionontati or Tobacco Nation, Erie, Seneca, Cayuga, and the Susquehannock or Andaste; and the eastern group, comprising the Mohawk, Onondaga, and Oneida. The tribal divisions of this eastern group apparently crystallized in late prehistoric times and much of their culture is of post-European development. It is generally agreed that the western group was parental to the eastern and Parker,[42] Houghton,[43] and others have discussed the probable routes of dissemination.

Generally speaking, the culture of the northern Iroquois nations[44]

[40] The picture of the mortuary complex is radically different in historic times. For obscure reasons, beginning with the earliest contact, grave goods were lavished upon the dead.

[41] 1921, pp. 24–36.

[42] 1916.

[43] 1927.

[44] As distinguished from the southern members of the Iroquoian family, the Tuscarora (the sixth nation of the confederacy about 1722), Nottaway, Meherrin, and Cherokee.

exhibits an essential homogeneity in all its phases. It is also obvious that developmental features, particularly in the ceramics, are ascertainable, and these, together with subtle tribal distinctions, and the genesis of the complex as a whole, constitute the principal problems in Iroquois archaeology. As a people, the Iroquois were inhabitants of rugged wooded country, preferring to dwell, at least in the prehistoric period, in marked contrast to their predecessors in the Northeast, far from navigable streams. Whether this predilection reflects antecedent custom or arises from the expediency of a new people entering hostile territory is not yet clear.

THE OWASCO ASPECT

Apparently partly coextensive in its later stage with the Iroquois occupation was a Woodland culture which constituted the dominant occupation of much of the Northeast for an unknown period prior to the Iroquois invasion. Its source, range and affinities with older manifestations in the area are largely matters for future research; nevertheless, with respect to implemental congeries and general configuration, the Owasco Aspect is one of the best elaborated in the whole area. Although reminiscent of Iroquois culture with respect to bone and stone work, the fundamental dichotomy in ceramics indicates different origins for the Iroquois and Owasco aspects.

The known distribution embraces the whole central portion of New York State from the Genesee River eastward to the Hudson, with one recognized site in the north-central part (Jefferson County), and small stations on both sides of the Champlain Valley in New York and Vermont. The Delaware Valley in southeastern New York, Pennsylvania, and upper New Jersey, and the Susquehanna Valley, at least as far south as the West Branch in Pennsylvania, contain numerous camp and village sites.

On the basis of pottery development two foci, presumably indicative of a temporal sequence, have been differentiated, viz., the Canandaigua and the Castle Creek. The stone and bone industries of both are indistinguishable and the basic pipe form (obtuse-angle elbow type) remains constant. The essential differences concern the pottery vessels which in a large proportion of Canandaigua specimens have a conoidal base, slightly everted collarless rim, and are of coarser texture and more rudely embellished than is the case with Castle Creek ware. All known examples of the latter are characterized by a rounded bottom and the frequent presence of an incipient or well-defined collar, often bearing nodes or bosses and surmounted by rim points or castellations. Although

the decorative motifs of both groups are fundamentally of the same order, being simple combinations of herringbone and other rectilinear line complexes impressed with denticulated or cord-wrapped stamps, applied to neck and rim, Castle Creek vessels exhibit predominantly more meticulous workmanship, greater originality and variety of design, and not infrequent rude and bold incising on the vessel neck. This latter decorative innovation contrasts strikingly with the finely achieved pointille work on the same vessel, the product of long tradition and experience, and constitutes, together with the rounded base, well constricted neck, collar, rim points, and nodes, all features of Iroquois ceramics, the stylistic considerations on which Iroquois-Castle Creek connections are predicated.[45] They are rarely present, and then in small degree, in the antecedent ware of the Canandaigua focus. What other accretions and what possible reflex from this contact may have occurred it is at present impossible to say.

It must be emphasized that the converse of this situation, i.e., the genesis of the aforementioned traits of Iroquois ware from Castle Creek prototypes, has been seriously considered and abandoned, as previously mentioned.

Considered *in toto*, the Owasco Aspect is characterized by camp, village, and workshop sites indicative of a relatively numerous population with an agricultural economy. Carbonized corn and beans have been found in components of both foci. The settlements, like those of the Iroquois, were sometimes on hilltops a mile or more from a lake or large stream, and one station seems to have been stockaded. Floor outlines of small, round, pole-supported lodges with central fireplace have been found at one component. Refuse-filled cache pits are abundant on some sites, rare on others. Few cemeteries have been located, but these have consistently produced skeletons flexed in varying degrees, only rarely accompanied by grave goods, chiefly pipes.

The deterministic elements of the material culture are large: more or less equilaterally triangular arrow-points, usually with concave bases and prominent barblike corners; obtuse-angle elbow pipes; and elongate-bodied, grit-tempered pots, with varying degrees of neck constriction, pointed or rounded bottoms, and punctate decorations utilizing frequently the herringbone design.[46]

Absent from the congeries are many of the negative traits of Iro-

[45] Ritchie, 1934, pp. 45–46, 50.

[46] See the following publications for the trait inventory as known: Parker, 1920, pp. 340–343; Ritchie, 1928; 1932 a, pp. 413–414; 1934; 1936; 1938, pp. 80–84, 96.

quois culture, viz.: burial mounds, cremation, copper artifacts, shell objects,[47] the gouge, grooved axe, plummet, and the slate problematical forms.[48]

There remains to be considered the probable ethnic identity of the Owasco Aspect and its wider affinities. While archaeological proof is still lacking, there is actually little reason to doubt its Algonkian provenience, and while all stations thus far discovered pertain to the prehistoric horizon, future excavations may disclose a protohistoric site enabling correlation with some historic tribe or tribes of this people.

Its archaeological affinities are still in doubt. The ceramics are fundamentally related to the great body of Woodland pottery in the eastern United States[49] and seem to the writer to have rather close parallels in ware from two supposedly Algonkian sites in Maryland.[50] Some Owasco resemblances are apparent, too, in certain of the pipes and potsherds of the newly defined Monongahela Woodland culture of western Pennsylvania[51] and in similar artifacts and arrow-points from two sites in southeastern Michigan, assigned by Greenman[52] to the Younge Focus of the Owasco Aspect. None of these, however, should be stressed, and to date the Owasco Aspect is not known to occur west of the Genesee River in New York.

THE VINE VALLEY ASPECT

What may be termed an intermediate period intervened between the well defined Owasco Aspect and certain old cultures widely pervading and long established in the Northeast.[53] Three occupations are embraced, one and possibly all of which were introduced from the Ohio

[47] One necklace of rolled native copper and marine shell beads was recovered at the Canandaigua site: Ritchie, 1936, pp. 50–51.

[48] A very few reworked gorget fragments and two complete pendants have been found on Owasco sites: Ritchie, 1934, pp. 39–40; 1936, p. 49; 1938, p. 84.

[49] Holmes, 1903, pp. 145–153.

[50] Ferguson, Alice L. L., 1937. This site and its artifacts were kindly shown to the writer by Mrs. Ferguson, and the pottery from the Shepherd site in Montgomery County, now in the U. S. National Museum, was seen through the courtesy of Mr. Frank M. Setzler.

[51] Butler, 1937; also unpublished notes on other stations in western Pennsylvania.

[52] 1937, pp. 95–96.

[53] There is no reason to doubt the relative age of the Owasco and Vine Valley aspects as given. A Point Peninsula burial rich in typical mortuary goods was found in the subsoil beneath the deep undisturbed refuse mantle of a Canandaigua Focus site at Jack's Reef, on the Seneca River, Onondaga County, N. Y., and the Castle Creek Focus seems to overlap the Iroquois aspect.

region.[54] They are among the least adequately elucidated horizons of the area due to the fact that nearly all discovered components, confined to burial sites and mounds, have been destroyed by relic collectors or commercial enterprise. The data presented are predicated upon salvaged material supplemented by limited excavations in New York and New England.

Of these occupations, two, viz., the Middlesex and Point Peninsula, although characterized by diagnostic differences, share such significant elements as the gorget, pendant, birdstone, so-called "bola stone," various types of marine shell beads, rude fabric- or cord-marked conoidal-based pottery vessels, and obtuse-angle elbow pipes of clay, and are consequently attributed to a single aspect, the Vine Valley. The third horizon is termed the New York Focus of the Hopewellian Phase[55] (Table 1). It must be noted that the chronological relations among the three are uncertain.[56]

Middlesex components have been reported from Maine, Massachusetts, Connecticut, Vermont, and east-central and central New York.[57] Scattered surface traces are of wider distribution, including particularly the upper St. Lawrence Valley. The burials, simple flexed interments, are usually accompanied by mortuary offerings. Occasionally a mass of powdered hematite occurs in the grave. The most deterministic culture trait is an Adena-like tube of stone or clay, with one end fully open and the opposite extremity somewhat flaring and centrally perforated with a small opening. It is thought to have been a smoking pipe. In addition to the traits previously enumerated as common to both the Middlesex and Point Peninsula foci, the former produces the following salient types: the boatstone; bar amulet; side- and corner-notched projectile points; double-pointed and triangular forms of blades; the copper celt, awl, and beads of two kinds; and a variety of bone work such as awls, conical antler arrow-points, a single pendant and gouge, and perforated elk canine teeth. Fishing devices have not been recovered.

Point Peninsula burial sites occur in lower Ontario, and northern,

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[54] Ritchie, 1937 a.

[55] Aspect undetermined.

[56] The possibility of the Middlesex being the oldest, followed successively by the Hopewellian and Point Peninsula, is suggested by the presence in the Middlesex of the blocked-end tube, a diagnostic element of the Adena, which is believed to have preceded the Hopewell in Ohio, and the fact that in Ohio the Intrusive Mound culture, apparently the equivalent of the Point Peninsula, is intrusive into Hopewell.

[57] Summarized, with references, in Ritchie, 1937 a, pp. 186–187.

western and central New York.[58] Flexed interments, sometimes in a seated position, predominate, but bundle burials and cremations are known. As elsewhere pointed out by the writer,[59] this focus has a large number of traits in common with the so-called Intrusive Mound culture of Ohio. Apart from the gorget, pendant, birdstone, "bola stone," shell beads, conoidal-based pottery vessel, and obtuse-angle elbow pipe, already referred to as links with the Middlesex, the chief items of the Point Peninsula culture equipment comprise: stone and pottery tubular pipes of nearly uniform diameter; rare curved-base and frequent straight-base monitor pipes, the latter often having a characteristic ridged stem; side-notched, corner-notched, triangular, and pentagonal-shaped arrow-points; large antler flaking tools; harpoons; daggers; conical antler projectile points; perforated sharks' teeth; and rolled sheet copper beads. Apparently diagnostic are beaver incisors hafted in antler tines and large antler combs usually engraved. Another distinguishing feature is the presence in most graves of pieces of unworked or partly worked bone and antler, the raw material for implement manufacture. Commonly the skeleton and its accompanying offerings are liberally covered with red paint.

THE HOPEWELLIAN PHASE

An Ohio "Mound Builder occupation" has long been postulated for the Northeastern area[60] on the basis of small burial mounds in western Pennsylvania, western New York and lower Ontario, and on certain non-mound cemeteries and surface scattered artifacts. Analysis, however, has revealed the essentially non-Hopewellian nature of most of this evidence. Yet in the past few years the Rochester Museum of Arts and Sciences has uncovered unequivocal Hopewellian vestiges in four mounds in the Genesee Valley, demonstrating that at least in western New York some of the rare tumuli were the products of this culture.[61]

The Hopewellian connections include mound constructional features, burial traits and artifact types; notably the use of stone for mound reinforcement, stone-lined and -covered graves, extended and cremated skeletons, use of the curved-base platform pipe of Ohio fireclay, pearl bead, small discoidal shell bead, quartz crystal, conch-shell container, breast ornament of sheet copper and silver over wood, copper ear-spool, copper axe, and chalcedony flake knife. This complex occurs integrated

[58] Ritchie, 1937 a, pp. 188–192.
[59] *Ibid.*, p. 188.
[60] Parker, 1920, pp. 83–98; Wintemberg, 1928.
[61] Ritchie, 1936 a, pp. 174–175; 1937 a, pp. 183–186, 192–193; 1938 a.

with a ruder and simpler culture which utilized the flexed and bundle modes of burial; crude pointed-bottomed vessel; obtuse-angle elbow pipe; steatite pot; side-notched, stemmed, semilozenge-shaped, and triangular projectile points; the "bola stone"; gorget; copper awl; and sundry other types many of which have been found on surface sites in New York unassociated with any of the definite recognized Hopewellian traits.

Apparently ethnic and cultural fusion must be invoked to interpret these finds; an actual amalgamation of detachments of Ohio Hopewell people and some more retarded local group. This process, occurring elsewhere in the Northeastern area, probably explains the attenuated Hopewell survivals which confused earlier investigators and led to the designation of a "Mound Builder culture," which, in the light of newer evidence, becomes a composit manifestation involving the Hopewell and one or more Northeastern cultures.

THE COASTAL ASPECT

In the writer's first published classification of New York cultures,[62] two additional foci were included in the Vine Valley Aspect: the Coastal and, tentatively, the Orient. Even then the validity of this assignment was in question and it now seems advisable to consider the Coastal as a separate aspect, of which the Orient may form a focus (Table 1). Two other foci may be postulated which for present convenience will be referred to simply as the "Early" and "Late." Other foci will probably be added after a full analysis is made of the material recovered by Harrington,[63] Skinner,[64] and other early workers in and about New York City, now in the collections of the American Museum of Natural History and the Museum of the American Indian, Heye Foundation, and the unpublished results of more recent explorations, chiefly on eastern Long Island, by the Long Island Chapter of the New York State Archaeological Association.

The Coastal Aspect seems to be traceable in northern New Jersey, tidewater New York and lower Connecticut, at least. Want of adequate data renders the distribution uncertain and also precludes a clean-cut definition of the culture complex. It is impossible, too, at this time to estimate the temporal relation of the "Early" Focus to other occupations in the New York area. The "Late" Focus, as shown by the ceram-

[62] 1936, p. 4.

[63] 1909, pp. 169–179; 1909a, pp. 125–138.

[64] 1909, pp. 3–61; 1909a, pp. 113–121; 1909b, pp. 213–235; 1915; 1920.

ics, was probably contemporaneous with the Castle Creek Focus of the Owasco Aspect and with the early Iroquois Aspect inland.

These subdivisions rest upon stratigraphic evidence, the "Early" Focus being represented by the lower level in rock shelters,[65] shell heaps,[66] and village sites[67] in New York and Pennsylvania. Omitted from present consideration is the famous Abbott station near Trenton, New Jersey, studied by Abbott,[68] Volk,[69] Mercer,[70] Skinner,[71] and Spier,[72] and the Rancocas Creek site[73] in the same state, pending publication of the findings of Cross and Golomshtok[74] at Abbott's and Red Valley, a component analogous to that on Rancocas Creek, which seem markedly at variance with those of the previous investigators.

Typical of the early horizon are the grooved axe; celt; adze; grooved, notched, and perforated bannerstone; gorget; a simple form of the sinew-stone; grooved club; "bola stone"; shallow mortar; cylindrical pestle; projectile points and knives of several forms: lozenge-shaped, semilozenge-shaped, stemmed, side-notched, corner-notched, and triangular, in order of frequency (lozenge and semilozenge-shaped and narrow-bladed stemmed and side-notched forms seem to be the oldest); drills and scrapers of several kinds, chiefly the simple oval end-scraper; rude pottery and stone pipes of tubular and obtuse-angle elbow types; and crudely fashioned vessels with straight sides and pointed bases, usually grit-tempered, with fabric- or cord-marked body and punctate decorations or, rarely, rough incisions. Bonework was weakly developed; the splinter awl, flat bone needle, conical antler arrow-point, chipping tool, and wedge or chisel, all consistently crude, being the main types. Burial was in the flexed position with few or no accompanying grave goods.[75]

In far eastern Long Island, a distinct manifestation, the recently

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[65] Harrington, 1909a, pp. 125–130.

[66] Skinner, 1915a, p. 57; 1919, pp. 52–74; 1920, pp. 129–136; Harrington, 1924, p. 245.

[67] Mercer, 1897, pp. 70–85.

[68] 1881, p. 471 ff; 1888.

[69] 1911.

[70] 1898.

[71] 1915a, pp. 52–55.

[72] 1918.

[73] Hawkes and Linton, 1916.

[74] Acknowledgment is accorded Drs. Cross and Golomshtok for data provided and an inspection of the excavations.

[75] Skinner, 1919, pp. 52–74; 1920, pp. 129–136; 146–163; Parker, 1920, pp. 344–346.

discovered Orient Focus,[76] may be partly coeval with the "Early" Focus just described, as judged from the occurrence of typical Orient arrow-points in one of the stations;[77] or it may antedate the more western focus.

The Orient material, of remarkable uniformity, occurs as grave goods in large cache deposits at the bottoms of deep grave pits in which cremated human bones and one bundle burial were revealed.[78] Large quantities of powdered hematite were present in some instances. No bone, shell, or metal articles or pipes have come to light, and but very little pottery.[79] Steatite vessels of several forms and sizes, all deliberately "killed," were common. Other important traits include rude rectangular celts; plano-convex adzes, some grooved; a single short gouge and a grooved axe; ellipsoidal two-holed gorgets; a short stone tube; hematite and graphite paint-stones; iron pyrites strike-a-lights; and arrow-points, spear-points, and knives prevailingly with narrow blades, side notches, and flaring concave bases—the so-called "fish-tail" type.

Both material and form indicate the derivation of the Orient complex from lower Connecticut, across the Sound, but there for want of search the trail is lost.

Returning to western Long Island, Staten Island, and the adjacent mainland, we may remark briefly on the "Late" Focus of the Coastal Aspect, which Skinner[80] regards as essentially a development from the "Early" horizon. It produces grooved axes; bannerstones and gorgets in much smaller numbers, on some sites not at all;[81] a preponderance of broad triangular arrow-points, although many of the older forms survive; a considerable amount of bone and antler work of fair quality, including the harpoon and fishhook; tubular and obtuse-angle elbow pottery pipes of finer workmanship; and pottery vessels with globular body, constricted neck, and everted rim, composed of grit- or shell-tempered paste, well levigated, modeled, and fired, and more carefully ornamented by means of punctate and incised techniques, the latter

[76] Two sites near Orient and one near Southampton have been found and excavated by Messrs. Roy Latham and Charles F. Goddard, of the Long Island Chapter, N.Y.S. A.A., to whom the writer is indebted for much information and an opportunity to study many of the artifacts.

[77] Skinner, 1919, Pl. VI, g′, h′, i; p. 64.

[78] This series, Vol. II, No. 1, pp. 53–54; Vol. II, No. 4, pp. 311–313.

[79] This was found only on the Southampton site and the possibilities of intrusion could not certainly be eliminated.

[80] 1915a, p. 58; 1919, p. 75 ff.

[81] Parker, 1920, pp. 346–348; Harrington, 1924.

more frequent than heretofore. Pointed-bottomed pots of better quality, however, continued in use, probably until the historic period.

In these modifications of the material culture of the "Late" Focus one sees evidently the inspiration of alien peoples to the west; at first the Castle Creek folk, subsequently the Iroquois.

From the foregoing fragmentary sketch it is manifest that the problems presented by the Coastal aspect are sundry and diverse. Most of the region involved is heavily populated and relatively few aboriginal sites remain. These must be intensively studied to fill the lacunae in existing knowledge of time relationship and culture transition. Greatly to be desired are protohistoric and early historic links to replace the present indefinite tribal identification of sites. This possibility is lessened by the fact that virtually everywhere throughout the tidewater region acculturation following white invasion was accomplished in a very short period.

THE LAURENTIAN ASPECT

We come now to a consideration of the older cultures of the Northeast, and here, perhaps, reach the first firm footing after the quagmire of the Vine Valley and Coastal aspects. Two basic occupations are discernible: the Lamoka Focus of the Archaic Pattern, and the newly defined Laurentian Aspect of the Woodland Pattern[82] with its several foci. The priority of the Lamoka Focus is so far largely assumed,[83] and its known horizontal range is smaller. The distribution of the Laurentian Aspect, based on surface material as interpreted by recent excavations, appears to include lower Quebec and Ontario, upper New England, and New York.

Thus far three foci, viz., the Brewerton, Vergennes, and Vosburg, have provisionally been postulated, and if present indications are sustained, the Blue Hill Component in Maine, excavated by Byers and Johnson for Phillips Academy, Andover, in 1936–37, which seems to equate with the Red Paint culture of Willoughby[84] and Moorehead,[85] may constitute a fourth. The Brewerton Focus is predicated upon the extensive excavations of the Rochester Museum of Arts and Sciences in 1937–38, at two large village sites at Brewerton, in central New

[82] Phase undetermined.

[83] Two reworked beveled adzes, typical of the Lamoka Focus, were found in the refuse of the Oberlander site at Brewerton (Laurentian Aspect).

[84] 1898; 1915; 1935, p. 16 ff.

[85] 1922.

York;[86] the Vergennes, upon Bailey's excavations in 1937, for the Champlain Valley Archaeological Society on a settlement site in Vermont;[87] and the Vosburg upon some eight surface sites in eastern New York, investigated largely by members of the Van Epps-Hartley Chapter, New York State Archaeological Association.[88]

To summarize, the Laurentian Aspect, like the Archaic, is the product of a hunting-fishing-food-gathering economy. Traces of agriculture and pipes are lacking from all sites. Clay and steatite vessel sherds occur on about half. At Brewerton pottery occurred only in the upper half of the refuse, but otherwise there was no essential change in content or typology throughout the zone of occupation. Pottery was met with at all depths at Vergennes. No cemeteries have been found, but at Brewerton numerous flexed, extended, bundle and cremated skeletons, with few or no grave goods, came to light throughout the deep refuse mantle. Gouges and plummets are the markers for this horizon. Important linked traits are bannerstones of several forms: oval, rectangular, trapezoidal, bipennate; the so-called chopper, identical with the Archaic form; and a wide variety of points, prevailingly broad-bladed, side- or corner-notched, stemmed, semilozenge-shaped, and triangular. At Brewerton many side-notched and triangular arrow-points had peculiarly "eared" bases. The chipped-stone category also affords many types of scrapers (end and side, unnotched and notched), drills, and numerous aberrant forms. There are rare celts and plano-convex adzes, numerous unpitted and pitted hammerstones, mullers, shallow mortars, cylindrical pestles, and copper objects including the gorge, awl, gouge, and celt. Bone and antler implements comprise awls of many sorts, harpoons, gorges, flat mat needles, beaver-incisor cutting tools, flakers, and conical arrow-points.

The elucidation of the Laurentian Aspect, now in progress, bids fair to solve the long standing mystery of the allocation of the semilunar knife or ulu and the broad-bladed point, both of ground slate, previously found almost entirely as surface strays without definite association over much of the northeast. They are generally regarded as traits borrowed from the Eskimo, possibly the little known Dorset culture.[89] To

[86] Ritchie, 1937.

[87] From an examination of the site and its artifacts by the writer, through the courtesy of Mr. John H. Bailey.

[88] Parker, 1920, pp. 485–486. Thanks are due particularly to Messrs. V. J. Schaefer, William Naylon and John Swart for the privilege of studying their collections and inspecting the principal sites.

[89] Jenness, 1925.

date they have not occurred *in situ* at Brewerton but have been found together at Vergennes in unassailable connection with deterministic forms, and the ulu is present on most of the Vosburg stations. Ground-slate points of several forms, but no ulus, are recorded for the Blue Hill shell heap. It is chiefly with respect to the occurrence of ground slates, plummets, choppers, and native copper tools that the various foci of the Laurentian are differentiated.[90] The gouge and most of the point types are universal for the aspect. It should be stated, however, that some of the missing traits may ultimately come to light as new components are found.

Where it occurs, whether in New York or Vermont, Laurentian pottery is fairly consistent in texture, form and ornamentation, being relatively thick, grit-tempered, moderately well fired, conoidal-based, and punctate-decorated, or rarely incised or comb-marked. One peculiarity is the channeling produced by scraping the interior.

In a word, the Laurentian is typically a Woodland culture which present knowledge suggests radiated into New England, New York, and Ontario from somewhere in the middle or lower St. Lawrence Valley. Information is needed respecting its source, probable Eskimoan connections, focal congeries and delimitations, and relative antiquity in the sundry precincts of the Northeastern area.

ARCHAIC PATTERN, LAMOKA FOCUS

Chiefly on typological considerations, the Lamoka Focus appears to be the oldest known culture of the Northeast, and without doubt it may be arrayed beside the Laurentian, which it may temporally overlap, as one of the specific and significant of the older complexes of the area. Unlike the Laurentian, however, it is best represented in the western portion and it seems to have entered western New York through the Ontario Peninsula.

Analysis of the data from three village sites, excavated by the Rochester Museum of Arts and Sciences,[91] supported by surface material from probable camp sites in western, central and southern New York, leads to the well founded conclusion that, in common with the Laurentian, it had a strictly non-horticultural basis. Pottery and steatite vessels are entirely missing from its remains. Chief among the hunting

[90] Blue Hill: ground-slate point, plummet; Brewerton: ground-slate point (on surface), plummet, chopper, copper tools; Vergennes: ground-slate point and ulu; Vosburg Focus sites: ulu, plummet, chopper.

[91] Ritchie, 1932; 1932b, pp. 407–409; 1936b.

equipment are arrow-points, javelin- and spear-heads, in order of frequency, all, with negligible exceptions, conforming to a single pattern. The blade is relatively long and narrow, and the tang or stem straight or slightly side-notched. The few exceptions may be knives rather than projectile points for the broad blades are often convexly edged. The known fishing devices comprise the hook, gorge, and net, the latter inferred from abundant notched sinkers. Diagnostic for the horizon is the beveled adze, often excellently fashioned from a compact crystalline rock, and in marked contrast to the crude lithic component which embraces the chipped drill, rectangulate and trianguloid celt, a thin celt-like blade, plano-convex adze, chopper, muller, mortar, flat grinding stone or metate, large stationary whetstone, pitted hammer and anvil-stone, and a few other types.[92] The purpose of the grinding stones was shown at the Lamoka Lake station by the large quantity of carbonized acorns and other wild vegetal foods.

The bone industry was well developed, comprising in addition to the hook and gorge already mentioned a host of awl types; whistles; tubular beads; worked teeth of the beaver, bear, and dog; antler punches; and some traits characteristic of, if not definitely confined to the Lamoka Focus. Notable among these are the deer-scapula scraper; several types of probable weaving tools; deer-astragali spindle sockets (?); split-antler-tine pendants and allied forms, sometimes painted; and various problematical artifacts.[93]

In addition to the lack of pottery, the significant absent elements include the smoking pipe, wanting also from the Laurentian Aspect; the bone harpoon; copper and shell objects; the grooved axe; gouge; plummet; ground slates; and the so-called problematical slate forms.

Less decisive at present than the characteristics of the material culture are the mortuary traits. The few burials found have been simple flexed inhumations without grave goods.

CONCLUSION

The foregoing concise archaeological survey of the extensive Northeastern area has indicated the complex nature of the problems involved and their partial resolution, mainly through the researches accomplished in New York State. Other cultures at present unknown are almost certain to be found, and some portions of the interpretation as given here will doubtless prove faulty with the progress of investiga-

[92] Ritchie, 1936b, p. 22.
[93] Ritchie, 1936b, p. 23.

tions. "As through a glass darkly," the broad culture configurations and group movements are now visible; they involve impingement on the area from nearly every direction, the partial fusion and reintegration of numerous discrete elements and complexes, and a time sequence not even to be approximated as yet.

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A REVIEW OF THE GEOLOGY OF THE CLOVIS FINDS REPORTED BY HOWARD[94] AND COTTER[95]

FRANK BRYAN[96]

IN SEVERAL sites on our high western plains, at altitudes of more than 4000 feet above sea level, artifacts have been found in apparently unquestionable association with Pleistocene mammal remains. Since the fossil remains connected with these important finds belong to a very definite geological age, this age becomes a geological problem which can only be solved, to any degree of scientific satisfaction, by following the rules governing conservative, orthodox geological research.

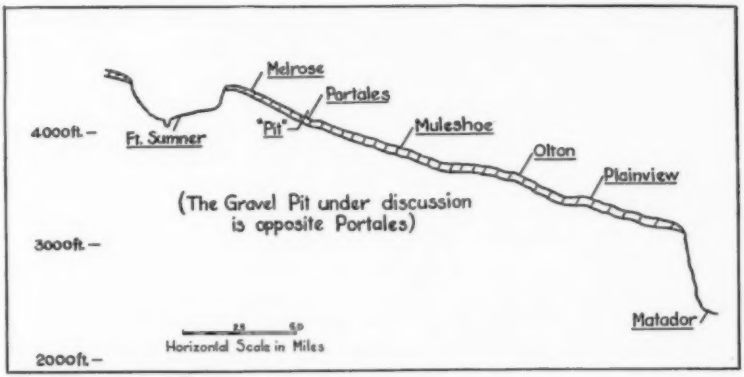


FIG. 5.—West-east profile across Staked Plains, following grade of "sand crawl" from escarpment top east of Ft. Sumner to opposite Olton.

To date, it seems that while the archaeological research connected with these finds has followed the orthodox pattern, there has been no effort made to apply to the important geological angle any of the rules or practices followed by conservative, professional geologists. We have, as a matter of fact, conservative archaeological field work being explained by a slipshod attempt at geological radicalism.

The rules governing geological research are identical with those governing archaeological research: when a new discovery is made, one be-

[94] 1935.
[95] 1937.
[96] Seaboard Oil Corporation, Dallas, Texas.

gins at the point of discovery and follows the discovery stratum wherever it goes, keeping careful records as to elevation, depth, and changes, if any, in the discovery stratum and the strata both above and below. These rules the writer will attempt to apply to the discoveries made by Howard and Cotter near Clovis, New Mexico.

To understand the importance of the Clovis finds, it is first necessary to understand the geology involved. These finds were made on the Staked Plains of Texas and New Mexico. The Staked Plains form an elevated plateau or tableland. It has a slight eastward tilt of about ten feet to the mile which, because of its regular, uniform rate, is among the geological miracles.

This regular eastward tilt is shown on the profile (Figure 5). The outline of the edge of the north half of this tableland, where the caprock breaks off in a sudden, almost vertical escarpment, is shown in Figure 6. This tableland stands up above the surrounding lands like a tilted draughtsman's table above an engineering office floor. That picture must be kept in mind, for this may well be the oldest land surface on the American continent. In nearly its present shape, and probably at its present actual surface, it has probably seen the Ice Age come and go, for this land surface has received no new material since being isolated as a tableland. It has suffered little from ordinary water erosion, for its normal slope, about one-foot-in-five-hundred, one-fifth of one per cent, is not sufficient for the water from ordinary rains to gather into streams. It is watered entirely by rains, between twenty and thirty inches per year. A six-inch rain, which would cause a flood on the headwaters of the Ohio, will soak into the ground of this flat-appearing plain over night; only an occasional pond will survive for a week.

Due to the absence of ordinary water erosion, and a constant scouring by violent wind erosion, the tendency through the ages, it seems, has been to scour and flatten the surface down to the level or horizon of the first resistant bed, which is commonly known as the "caprock." Actually this caprock is more a residual mass of broken fragments of indurated stone, principally chert, than a ledge proper. The down-percolating waters have continuously dissolved away the lime from what was once a thick limestone stratum, leaving the insoluble flints and cherts to form a resistant mat or agglomerate. It is, on its outcropping edges in particular, recemented by lime to the extent that it is commonly called "calichi." At its outcrop around the edge of the Staked Plains, this caprock is so solidly cemented that it rings sharply under a hammer. And since water does not actually run over it to wear it away, but seeps

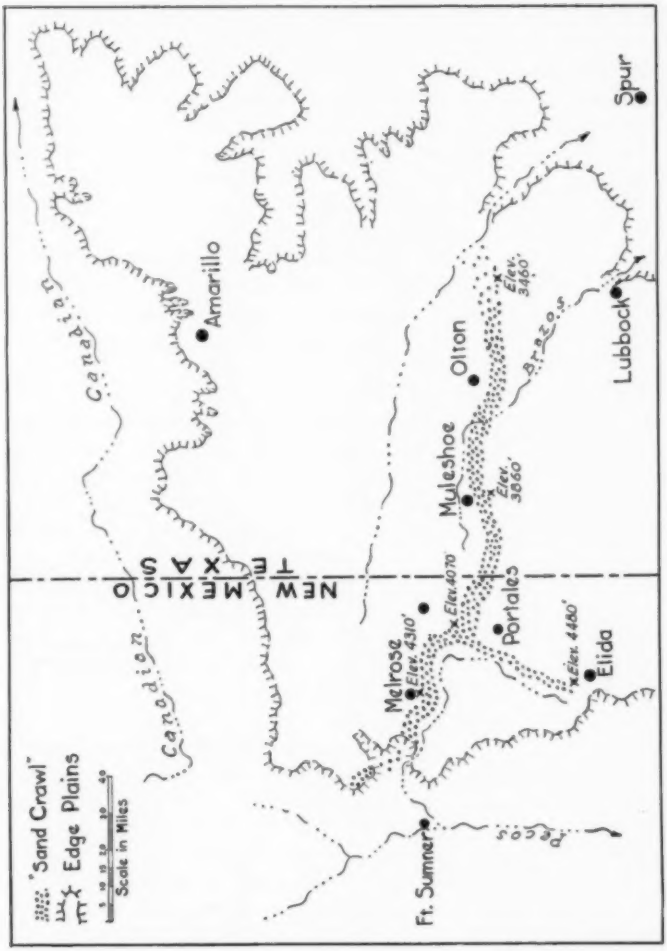

"Sand Crawl"
Edge Plains
Scale in Miles
NEW MEXICO
TEXAS
Canadian R.
Amarillo
Melrose
Elev. 4310'
Elev. 4070'
Portales
Elev. 4480'
Elida
Ft. Sumner
Pecos R.
Muleshoe
Elev. 3660'
Olton
Elev. 3460'
Brazos R.
Lubbock
Spur

FIG. 6

out through fine cracks to be quickly evaporated, leaving behind more lime as cementing material, this caprock does not now weather away any faster than the brick in an ordinary brick building. This is a fact worth remembering when one attempts to calculate the age of the Staked Plains as an isolated plateau.

When one bears in mind that the great area covered by the Staked Plains is actually an elevated tableland, which has been subjected to only the polishing effect of violent wind storms, plus a gradual eating away of the limestones and calcareous marls beneath by percolating waters, the numerous geological problems connected with its age and origin lose most of their complex features. When one remembers that it is probably the oldest land surface on the American continent, that it has probably existed throughout the Ice Age, and that it still stands proudly more than 4000 feet above sea level on its highest northwestern edge, this tableland becomes one of the most interesting areas we have in America.

It is possible to write a full-length book telling of the details connected with the many geological problems this tableland affords. Space will allow a listing only a few high points. Here we can study the history of America from probably the beginning of the Ice Age. Before being isolated by stream piracy as a tableland, several deep canyons were cut nearly the whole way across. These are now filled to where they are called "draws." Engineers seeking bridge foundation formation in the draw just west of Plainview are reported to have encountered 140 feet of fill. The filling of these old canyons, with wind-swept dust of the surface of the plateau, is still going on. Beneath the plains are several buried mountain ranges. These we have located by deep drilling for oil, and by use of seismograph where no deep wells have yet been drilled. Over some of these buried mountains the caprock seems to arch. Over some of the larger geosynclinal zones paralleling buried mountain ranges, the caprock definitely sags into a shallow synclinal trough, the bottom axis of which tilts to the east with the normal tilt of the surface of the plains as a whole.

Of particular interest here, in reference to these synclinal troughs, is that in the pre-tableland time, when this plain was crossed from west to east by large rivers, these flowing streams seemed to seek out and follow the large east-tilted synclinal troughs. Streams follow this practice, as a rule, where thick beds of hard rock are overlaid by soft material, and the dip into and out of the geosynclines is only a few feet to the mile. The gentle tilt of the surface rocks beneath the plains encourages this type of stream erosion.

It is, then, no accident which caused the so-called "sand crawl" to take an almost due east course across the plain, when the regional dip is decidedly to the south of east, for it runs parallel to a buried mountain range which has an eastern trend.

Our interest is centered in this Sand Crawl because it covers the discovery stratum in which Howard and Cotter made their finds. The area covered by the dunes of this so-called Sand Crawl is shown stippled by black dots on the map of the plateau (Figure 6).

The Sand Crawl is the one outstanding landmark on the surface of the Staked Plains. In the early days hunters reckoned distance from it like sailors reckon distance from the Greenwich Meridian. It is a continuous chain of low sand dunes, from three to five miles wide, which winds eastward across the Staked Plains for a distance of about 130 miles. These dunes are so overgrown with shinnery as to form thickets, which are in many places impassable to a man on horseback. The whole tends to form a great natural hedge.

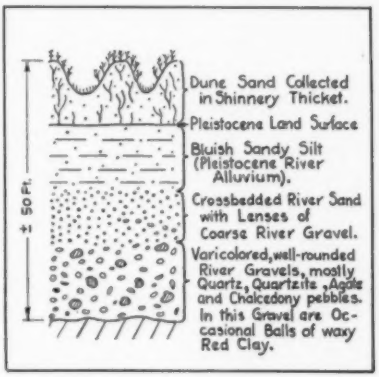
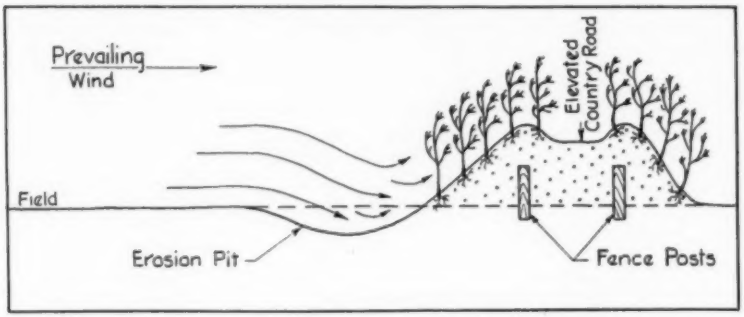

Dune Sand Collected in Shinnery Thicket.
Pleistocene Land Surface
Bluish Sandy Silt (Pleistocene River Alluvium).
Crossbedded River Sand with Lenses of Coarse River Gravel.
Varicolored, well-rounded River Gravels, mostly Quartz, Quartzite, Agate and Chalcedony pebbles. In this Gravel are Occasional Balls of waxy Red Clay.
± 50 Ft.

FIG. 7.—Type geological section where all elements are present. All formations below the base of the sand dunes carry an abundance of Pleistocene fossils.

Fig. 7 shows a type geological section of this Sand Crawl belt. The dune sand appears to be a somewhat accidental, superficial feature. The cause lies in the sands and gravels below. These are open and porous enough to hold sufficient water from the twenty or more inches of average summer rains (and the rainy season here is in the summer) to furnish permanent moisture for the roots of the shinnery to sustain life the year around. Once the shinnery began to grow in dense thickets, these served as traps which began to catch wind-blown dust and sand, and protect it in place when caught. The violent sand storms of the past have made of this superficial covering an outstanding landmark, for there is sufficient summer rain to keep this accumulated dune sand filled with moisture. Now the shinnery takes root and grows in dense thickets over dunes more than twenty feet high, which, together with coarse grass and weeds where the shinnery is absent, continue to catch more sand from the now seasonal dust storms. The sand dunes do

not "crawl," as the name implies; they simply develop wherever coarse grass or weeds, or shinnery, grow close enough together to catch dust from passing storms.

When for any reason, whether an attempt at farming or cattle gathering around a windmill, the shinnery or coarse grass is killed out, the sand does begin to crawl. It is usually swept clear of the old alluvial land surface in what is locally called "blowouts." Where these blowouts cover an acre or more, the wind occasionally scours up a portion of the



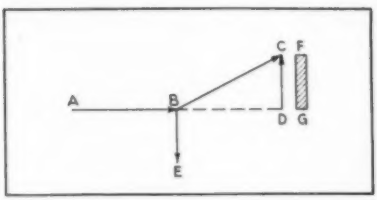


FIG. 8.—Upper: section across fence-row sand dune (former country lane) two miles north of Hawley. Lower: diagram showing why erosion pit is dug in front of obstruction. When the air current (AB) climbs the obstruction (FG), there must be an upthrust equal to CD. This force digs into the ground at the actual point of deflection B. Its downthrust (BE) is equal in force to CD.

alluvium below, and sometimes even digs down into the river sands below the alluvial stratum.

The forming of hedge-trapped sand dunes is common to the sandy portion of the western prairies and plains where there is sufficient moisture in dune sand to sustain coarse grass, weeds, or small trees. Fence-row sand dunes are common to numerous areas where sandy soil has been put to the plow. Russell[97] cites this fact in discussing why any kind of an obstruction causes silt to be deposited near the mouth of the Mississippi. Type locations where the recent growth of fence-row dunes

[97] 1936.

can be studied in detail, involving the burial of fences to a depth of ten feet in twenty years, are just west of Vernon, Texas, just north of Hawley, Texas (Figure 8), and along the highway some twenty miles southeast of Eastland, Texas. A study of the dune growth in these areas explains the presence of the Sand Crawl.

All of the geological section shown below the base of the sand dunes in Figure 7 can be called the discovery stratum, for it is a geological unit. It was in the upper half of this stratum that Howard and Cotter

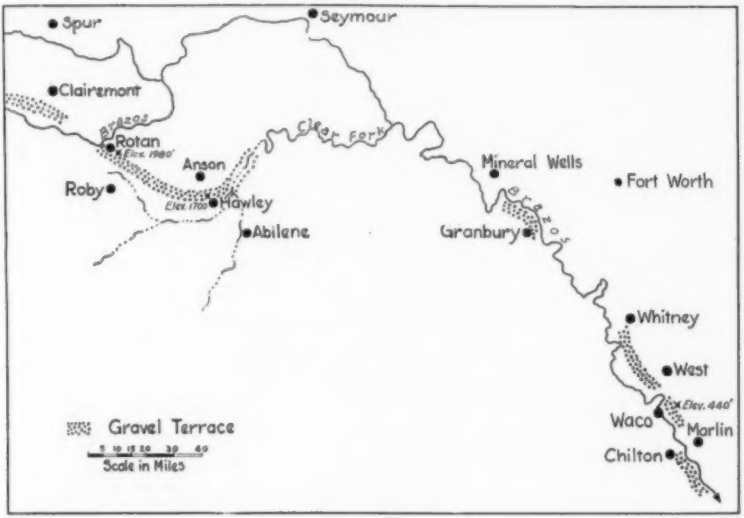


FIG. 9

made their finds. The age of the artifacts found in this stratum can only be determined with any degree of accuracy when all geological factors are taken into consideration.

Since the geology of this discovery stratum has been, I think, misunderstood by all who have so far written of these finds, I will begin first by presenting verifiable data. If anyone is disinclined to believe them, because they tend to disprove what others have written, he can go into the field and review the facts I present.

On the map (Figure 6) is shown, stippled with dots, the area on the surface of the tableland or Staked Plains which is actually covered by

the discovery stratum, with elevations and sea-levels data at enough critical points to show its eastward tilt or pitch, which is about 1000 feet to the hundred miles. The discoveries by Howard and Cotter were made in a gravel pit in this stratum near a line between Clovis and Portales and just west of the point with elevation shown as 4070.

On the map shown in Figure 9, which overlaps that shown in Figure 6, on its southeast corner for a sufficient distance to include the town of Spur on both maps, I follow the Brazos, showing stippled with dots

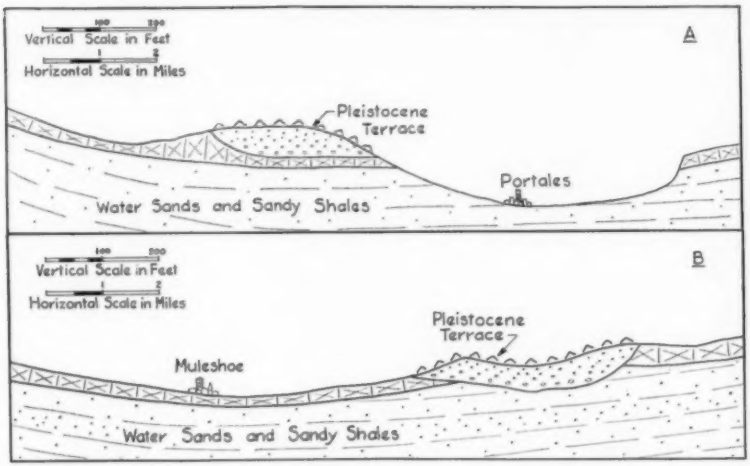


FIG. 10.—(A) North-south section through Portales. There are Cretaceous fossils in and below the caprock on the south side of the valley. (B) North-south section through Muleshoe.

the several areas covered by long, continuous outcrops of this same discovery stratum. The section of principal interest on this map (Figure 9) is the stippled belt running from Rotan to Hawley. Just north of Rotan, what is now the main channel of the Brazos, known locally as the Double Mountain Fork, had its waters diverted by stream piracy into the present course. In Pleistocene time, the main channel followed the stippled zone from Rotan to Hawley and then down what is now Clear Fork.

In the upper half of Figure 10 is shown a section across Portales Valley at the point of discovery. The finds made by Howard and Cotter

were in the Pleistocene terrace which makes the high rise north of Portales. My surface profile here is based on a precise level line run by the United States Coast and Geodetic Survey, which established permanent bench marks at about two-mile intervals from Clovis to Portales, and south from there across the valley. Anyone wishing to check this most important profile can get locations and elevations of these bench marks by writing the Survey at Washington.

The lower half of Figure 10 shows a section across the Pleistocene terrace and valley at Muleshoe. Here it will be noticed that the terrace swings across to the south side of the valley. The elevation here, sea level datum, of the highest point on the terrace is 3860 feet, as against 4070 feet north of Portales, some twenty miles to the west.

Figure 11 shows two sections at right angles to each other across and along the north end of the streamless valley at Rotan, Texas. This streamless valley is most interesting. It is a broad, fertile, farmed valley about ten miles long by two miles wide, which appears to drain to the south. In it there are no surface streams, ditches, or drains of any kind. The flood waters from hard rains do drain to the south; but as in the Sand Crawl of the Staked Plains, they soak into the gravels of the old river bed below and drain off underground. Here, however, the protecting covering over the old alluvial flood plain is not weed-and-shinnery-collected blow sand. Here it is quite apparent that at the time the waters were diverted from this old channel by stream piracy, the stream ran between comparatively high bluffs of soft Permian sandstone. Once the stream was beheaded, soil washed off these bluffs, polishing them down to their now late middle-age appearance, and filled in an outwash alluvial covering over the original alluvium of the old stream proper.

The full-width exposure of this relic of a river bed, where it is shown as capping the bluff in the lower half of Figure 11, is one of the most interesting outcrops of Pleistocene beds to be found anywhere. Here is duplicated in every detail the same formations discussed by Howard and Cotter in their descriptions of the formations in which their finds were made in the gravel pit north of Portales, with one single exception: at Portales the protecting cover is blow sand; at Rotan it is outwash alluvium from the bordering hills.

Another interesting feature here is the age of the topography to the north and south of Rotan. To the north, where the post-piracy drainage level is around 250 feet lower than that of the old stream, the topography is typical "bad land" and has an extremely youthful appearance. To the south and west, where the relic of the Pleistocene stream bed

still serves as a drainage channel, the hills are low, rolling, and in late middle age. Here is presented a convincing example tending to prove

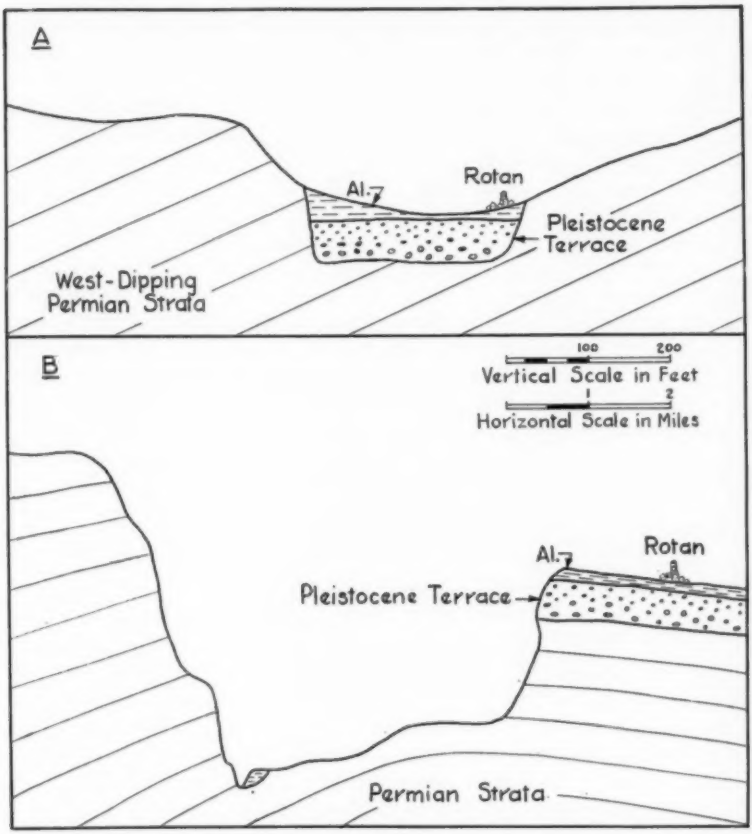


FIG. 11.—(A) West-east section across streamless valley at Rotan. (B) North-south section across the same valley. "Al" represents alluvial fill from bordering hills.

the theory that for deep, sharp canyons to be dug, and typical "bad land" topography to form, one must have a stream stealing the headwaters of another and much larger stream. As an example, it is now

thought that the Brazos of Texas once drained the area above the Grand Canyon now drained by the Colorado. When the Colorado diverted this water from the Gulf of the Pacific at about a net mile lower elevation, it was the waters from the full-functioning drainage system which gave it the sudden load of headwaters necessary to dig the Grand Canyon. An encroaching stream, feeling for its headwaters in driblets, could not be expected to do such a thorough job at digging on bottom. But this is all in the field of pure speculation, subject to proof by tracing the discovery stratum herein discussed to its extreme northwest point of origin, with a careful checking of grade.

Figure 7 shows sections across the Brazos at Waco, and across the Clear Fork at Hawley (Figure 9). Here again, we notice that in post-Pleistocene time the streams have deserted their old beds as terrace relics and have dug themselves new channels alongside. This is typical. River terraces are never evenly balanced on either side of a present valley as shown in many text-book illustrations. The tendency always is to dig new channels alongside. There is a reason for this. Any considerable body of sand or gravel, or both, absorbs the shock of water erosion like a rubber tire absorbs road shock. The water will not flow over its surface. It is absorbed and seeps out through the pore space, softening the adjoining strata and opening up a parallel channel, on the down-dip side as a rule, where the strata are tilted.

In this connection, it might be well to point out that the text-book types of terraces, running at equal levels on either side of valleys, tend to exaggerate the importance of the so-called Pluvial era. A study of post-Pleistocene terraces, over practically the whole of the Southwest, reveals practically no evidence of a flood or Pluvial period following Pleistocene. Where the terrace remains are many times as bulky and broad as the alluvial bottom deposits bordering present streams, shown in the Waco and Hawley sections (Figure 12), a study of the headwaters usually discloses evidence of the great flood waters having been diverted by stream piracy.

Having seen the area covered by the discovery stratum, with sections showing its detailed topographical positions for a distance of close to 500 miles down to Brazos from the point of discovery, one can begin to draw conclusions. But one must bear in mind that the pebbles of the gravels have apparently the same source, and show the same degree of rounding wear. The fossils found in these gravels and associated sand from Clovis to Waco belong to the same family. Howard's and Cotter's descriptions of the fossil remains found in the pit at Portales will fit the

fossils found in the gravel pit north of Waco. Their geological section, to and including the balls of red clay, a type characteristic of this particular gravel and sand group the full length of the Brazos, is identical to that in the bluff just north of Rotan, and in places north of Hawley.

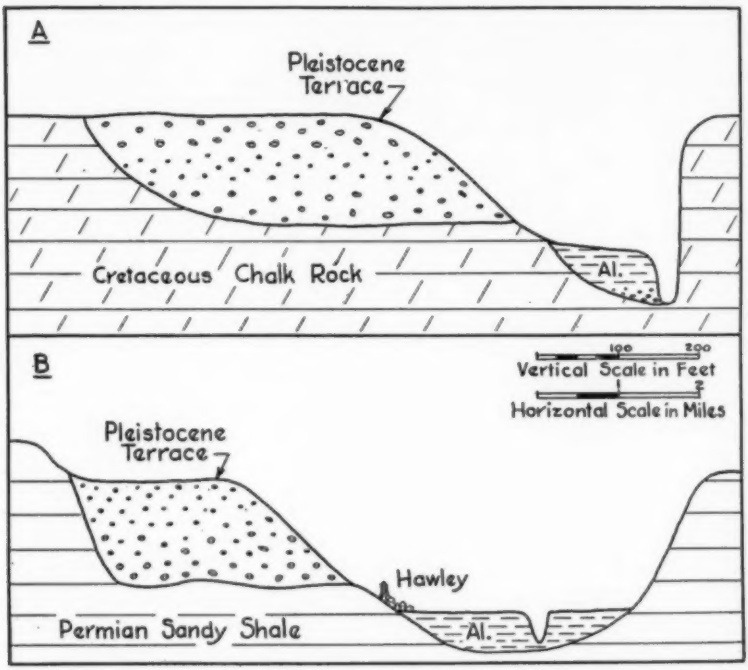


FIG. 12.—(A) Northeast-southwest section across Brazos at north edge of Waco. (B) North-south section across Clear Fork through town of Hawley. "Al" represents recent bottom alluvium.

Over most of the area north of Hawley, though, and all the way down to Waco, the upper bluish alluvium has been eroded away.

It should be quite apparent that this discovery stratum is a river deposit. Its geological section, coarse gravels and sand, the whole topped by a layer of sandy alluvium which has a clean-cut, land-surface top, is typically that of flood-plain alluvial deposits along streams which have sufficient grade, at least five feet to the mile or over, to move coarse

gravel. In streams with comparatively steep grades, the gravels hug close to the bottom of the stream bed proper. The sand is deposited above in an irregular pattern on shoals. As the stream eats outward on its gentle swings across the bottom, mud or silt is deposited above the shoal sands. This last layer soon sprouts weeds and even large trees, which furnish the carbon for the bluish color. This last silty layer always has a columnar cleavage in steep banks. Howard calls attention to this last feature in his description of the gravel pit.

It must also be remembered that there are no ox-bow lakes along streams which have a grade of more than three feet to the mile. Lakes belong to streams, as a rule, which have a fall of less than one foot to the mile. Where the grade is more than five feet to the mile, and the silty alluvium proper is underlaid by porous sands and gravels, flood-water lakes rarely survive for more than a week or two. The water is absorbed into the open sands and gravels below.

These basic facts need to be explained because both Howard and Antevs[98] say the Clovis finds came from lake deposits. Neither attempts to outline the size of their lake, as to whether it covered only a few acres, a few square miles, or filled the whole of the Portales Valley. Nor does either attempt to explain the total absence of the finely laminated silts which are common to lake deposits the world over. They do not attempt to explain the presence of coarse sands and gravels in or below their lake deposits, nor are they clear as to whether or not the gravels are to be included. Since both are vague as to the area covered by their lake, or lakes, it will be necessary to give a detailed description of the Portales Valley.

In assuming that the upper silty sands of the discovery stratum are a lake deposit, one must choose either a small lake, covering from a few acres to a few square miles, or a really large lake which filled the whole of the Portales Valley. In choosing a small lake, a study of the profile north of Portales (Figure 10) shows that the lake would now be on the crest of a high rise, where the sands and gravels will, at present, absorb all the water from a flooding rain almost as fast as it falls. If we assume that in Pluvial time the gravels were walled in by impervious strata, as in the present streamless valley by Rotan (Figure 11) we find that today all rain water there, even from a sudden six-inch fall, is absorbed as fast as it falls, and slowly drains out and away through the gravels. The gravels at Portales have about the same eastward fall as those at Rotan

[98] 1935.

have to the southeast. Small lakes resting on the sands and gravels of this high, sandy rise seem to be a hopeless geological solution, even if we do not ask where the sand and gravel came from. They are strangers to the surface of the Staked Plains.

If we assume that the Portales Valley is a basin which was once filled with water to the extent that our Portales sands and gravels are a remaining lake-shore terrace, there should be a terrace at equal elevation along the south side of the valley. No such terrace exists. At its

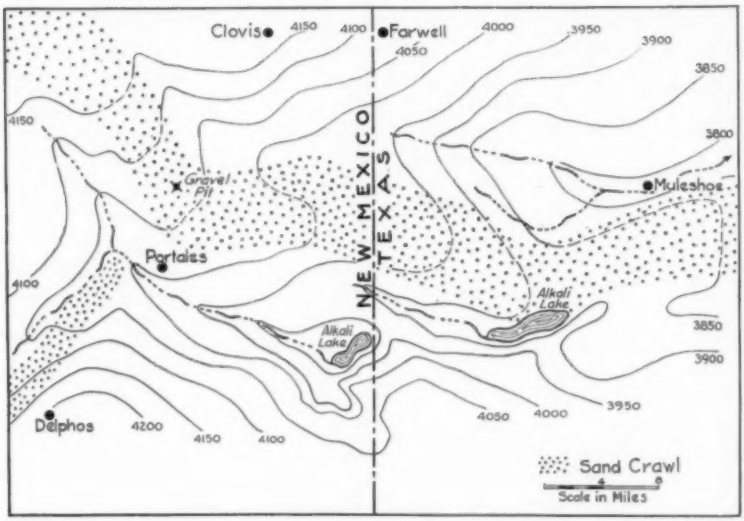


FIG. 13.—Topographic map of Portales Valley; 50-foot contours, sea-level datum.

level instead is an outcropping ledge of badly disintegrated limestone of Cretaceous age. (Antevs says that these underlying rocks are Tertiary. All recent geological maps of New Mexico show Cretaceous rocks outcropping along the south edge of the Portales Valley. Winchester's[99] map is the best, although I find him extremely conservative, leaving out a large area where the Cretaceous is covered by only a thin film of soil.)

However, the Portales Valley is not a basin. Figure 13 shows a fairly accurate topographical map of the valley. If one sets up a level in the

[99] 1933.

exact lowest point on the valley floor just south of Portales, a level line will clear what appears to be the east rim of the basin. That steady eastward tilt of the plains is extremely deceiving. It is no place to attempt estimating elevations by the eye alone.

It is true that there is a very large so-called alkali lake in a small basin near the Texas line down the valley to the east of Portales. Such lakes in east-tilted basins are very common to the Staked Plains. From the glint of salt and alkali on their usually bare white sand, it has been assumed by many that they have been slowly going dry throughout long ages, a slow drying of the country as a whole. Yet these lakes are fed by the drain-off waters of their basins, at the rate of some thirty inches during the six months from June to October of 1937, an unusually rainy year on the Staked Plains. Yet being constantly refilled by the run-off of some five inches of rain per month over the whole of the valleys or basins they drain, they continue to be the same barren alkali lakes. When flooded by rainwaters, the water passes through the sands of these alkali lakes into the water sands beneath the plains down-dip to the east. Where measured, the water level of these lakes when flooded is sometimes lowered as much as six inches per day. They are simply escape points into which all flood waters from the valley flow, to be there held temporarily while being taken into the water sands beneath the plains to the east.

Portales Valley is just another limestone synclinal valley. Water draining into it from off the anticlinal high to the south finally dissolved away all of the lime of the caprock, and in the marls below, just as Carlsbad Cavern was dissolved out of limestone, the water slowly passing east down the dip of the water-bearing strata beneath the plains.

For those unacquainted with the water supply beneath the Staked Plains, I might explain that it has the best underground supply of any area of similar size anywhere. Irrigation from shallow wells is common practice, especially in the rich Portales Valley, where an unlimited supply of fresh water can be had at a depth of twenty feet. The alkali lakes are where everything has been removed down to about the level of this shallow water sand. The water moves as in a river, down to the east beneath the plains in a thick sand-and-gravel formation. This east-moving water level is in constant change. Baker[100] says that the water table rose three feet at Muleshoe in the spring of 1914. At Plainview it sometimes rises as much as five feet during the irrigation season. They have no

[100] 1915.

floods on the surface of the Staked Plains, not even after cloudbursts, but they have high water which shows up in the water-table level. The crests of these rises move eastward beneath the surface like the crests of floods move down the Mississippi. It usually takes only about six months for the crest of such a rise to pass a given well.

When one bears in mind that east-tilted basin-like valleys, like that at Portales, are only gigantic sink holes dissolved out in synclinal sags in thick limestone and marl strata, their presence offers no great geological problem. Moreover, the eastward tilt of the floor and rims of Portales Valley makes it impossible for it to have ever been filled to the level of the discovery stratum, for such a large lake would have had nothing but thin air for an eastern containing edge. A study of the profile (Figure 5) shows how impossible is the large-lake theory.

In conclusion, geologists have long held that the Sand Crawl covers a relic river bed, that of the Pleistocene Brazos before it was beheaded by the Pecos just north of Fort Sumner, New Mexico. Baker,[101] Udden[102] and Theis[103] are only a few who have so held. The Clovis finds of Howard and Cotter appear to have been taken from the alluvium of the flood-plain bottom lands which bordered this stream before it was beheaded by the Pecos. Their finds came from a very definite geological horizon which holds the same physical characteristics, and the same fossils, for an outcropping with an over-all distance of over 500 miles. Theirs is a typical geological section of this Pleistocene, river-deposited formation. It is a formation upon which time can be estimated.

This Pleistocene Brazos was beheaded by the Pecos before the Staked Plains became an isolated tableland. The age of the relic bed of the Brazos, and all fossils and finds found within the alluvial deposits left by this stream, is at least that of the valley of the present Pecos at the point of piracy. At this point, the present valley of the Pecos is twenty-eight miles wide. If we assume that this valley has been widened parallel to the direction of the stream, at the rate of one inch per year the age of these finds becomes at least 1,774,080 years. This is a very conservative estimate, for at the present time the caprock escarpment overlooking the Pecos is not being eroded away any faster than the brick in an ordinary building. To bring the age of these finds down to even 2,000,000 years, one has first to make a dogmatic assumption, based on no actual evidence, that in the distant past the rate of erosion

[101] 1915.
[102] 1916.
[103] 1932.

of the caprock, escarpment edges of the Staked Plains, and in particular the escarpment overlooking the Pecos, was at least ten times that per year which has taken place since the first of the Pre-Basket Makers settled in the Pecos Valley.

To be logical in the face of geological facts, one must admit that Howard and Cotter have made finds of really great antiquity. The importance of their finds rests, however, not so much on this first bit of evidence as upon their discovery of a Pleistocene stratum which carries human-shaped flint implements. This stratum is, in fact, a Pleistocene river bottom with its original land surface preserved intact by a protecting covering of dune sand. Thus preserved in place, it extends for more than one hundred miles across this ancient land surface, atop the crest of an isolated tableland, the Staked Plains. All one needs to do throughout the full length of the Sand Crawl is to sweep aside the sand covering. There will be exposed the actual land surface upon which Folsom Man walked, upon which he made his camp on a river bank, or within the protecting timbers of the wooded bottom lands nearby, primitive man's ideal dwelling place. This discovery stratum should prove an archaeological gold mine.

Lest some future investigator become confused by upper, superficial cultures, I will offer a very apparent explanation for their presence. For ages the annual rainfall has been sufficient to keep the dune sands, as well as the silts, sand and gravel below, saturated with water. This water seeps out along the lower edges overlooking the present bordering parallel valleys, in what is now a chain of seep springs, where one has to dig for only a foot or two to get drinking water in abundance. The shinnery acorns offered an inexhaustible food supply in acorns alone. The shinnery is, even now, teeming with small game, a second food supply. The Basket Makers and the Comanches visited the Sand Crawl for food in season. The dune sand is filled with a tangle of overlapping cultures, including fragments of Model-T Fords; but this confusion seems to end once one reaches the original bluish alluvial land surface below the dune sand. In it, and below, all fossils are Pleistocene. Here the artifacts seem, so far, to belong to the so-called Folsom culture. To explore for further evidence of Pleistocene man beneath the Sand Crawl, one must brush aside these upper, superficial cultures along with the dune sands to which they belong.

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THE GALLINA PHASE[104]

FRANK C. HIBBEN[105]

Following a recent recrudescence of interest in the archaeology of Athabascan-speaking peoples in the Southwest, and in Navaho archaeology in particular, numerous students have entered upon various projects in this field. North central New Mexico has seemed to offer the most fertile center for such studies, inasmuch as early historic records place the Navahos in this area and the archaeological remains seem to corroborate this testimony.

In the heart of this region, a small tributary of the Rio Grande known as the Gallina flows by a circuitous route into the Chama. This is the center of an area, long known as the "Gallina country," which is roughly bounded on north, east, south, and west by the Jicarilla Apache Reservation, Chama River, Jemez and San Pedro Mountains, and Continental Divide, respectively. This is a vast stretch of canyon and upland country for the most part lying in the transitional zone of pine-covered mesas and sage-covered valleys and canyons.

In the 1937 field session, the University of New Mexico began excavation on one of the major sites of the Gallina territory as part of a program of reconnaissance and exploration initiated in 1933 incidental to the Navaho project. This reconnaissance, although far from complete, has indicated the focus of an important cultural phase on the Gallina stream which offers remarkable and interesting contrasts with other Southwestern areas. It is most surprising to find an aspect so different in the center of a territory which has presented only typical Pueblo variations. Due to the apparent distinctiveness of this complex from those which are in general termed Puebloan, or the sites which have Athabascan connections, it seemed necessary to designate it separately as the "Gallina Phase."[106]

Some hundreds of sites for the Gallina Phase have been determined

[104] "Phase" is used in this sense according to the McKern classification. This would correspond perhaps to the designation "branch" in the Gila Pueblo system. That it is a distinct cultural manifestation seems evident from the data here presented.

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[106] Material which is apparently affiliated with the Gallina Phase appeared in AMERICAN ANTIQUITY, Vol. 3, No. 3, January, 1938, in an article entitled, *Some Aspects of the Largo Phase*, by H. P. Mera. Although undoubtedly connected with the Gallina problem, the Largo is on the other side of the Continental Divide from and peripheral to the Gallina country.

so far, concentrated in great numbers around the town of Costilla and the central section of the Gallina Valley. These are located over the Gallina field in three types of locations. The majority occupy positions on cliffs, promontories, and knife-edge uplifts, which are obviously defensive. Some of these are on remote ridges of difficult access. A somewhat smaller number of the Gallina sites is found on the low terraces and headlands along the streams. It is to be hoped that a larger series of tree-ring dates will give some explanation of this separation. Also, a number of cliff-cave ruins in the vicinity, judging from surface evidence, are products of the Gallina culture.

However defensive or non-defensive these sites may be, their culture manifestations, at this present stage of investigation, are inseparable. These Gallina dwellings are single house units of fair size with average dimensions of about eighteen feet by twenty feet. A site consists of a group of these units, usually of from three to four, but in some cases there is only a single isolated unit.

A total of three separate sites was examined, including some nine houses. Two of these sites had been rifled by pot hunters who had left no scientific data. However, specimens were secured. In the third instance, the University of New Mexico excavated five of a group of eight houses located on a small knife-edge cliff on the north side of the Gallina River. Insomuch as this ruin appears to be typical of the class, it may here be taken as the type example. This house group has been termed the Cerrito Group.

The Cerrito houses are perched on a small eminence some 400 feet above the canyon floor. The house units are crowded along the edge of the cliff in single file except for the last three to the east which are grouped together. In a small saddle immediately to the west lie four pit house depressions. This occurrence of large masonry house units and pit houses in conjunction is one of the first and outstanding features of the Gallina Phase. The surrounding pine-covered hillsides, and most especially those on the slopes across the Gallina Canyon from the Cerrito group, are covered with many thousands of terraces. These terraced slopes bring the trait of terracing, apparently for agricultural purposes, far north of its accepted extent.[107] Their connection with the Gallina peoples seems certain, by reason of the typical house unit ruins occurring on these same slopes.

The house units of Cerrito are round-cornered square buildings,

[107] This is especially interesting in the light of the Hopi terraced gardens.

FIG. 1.—Wall of Cerrito at Cliff edge to the southeast.

FIG. 2.—The distinctive Gallina type axe.

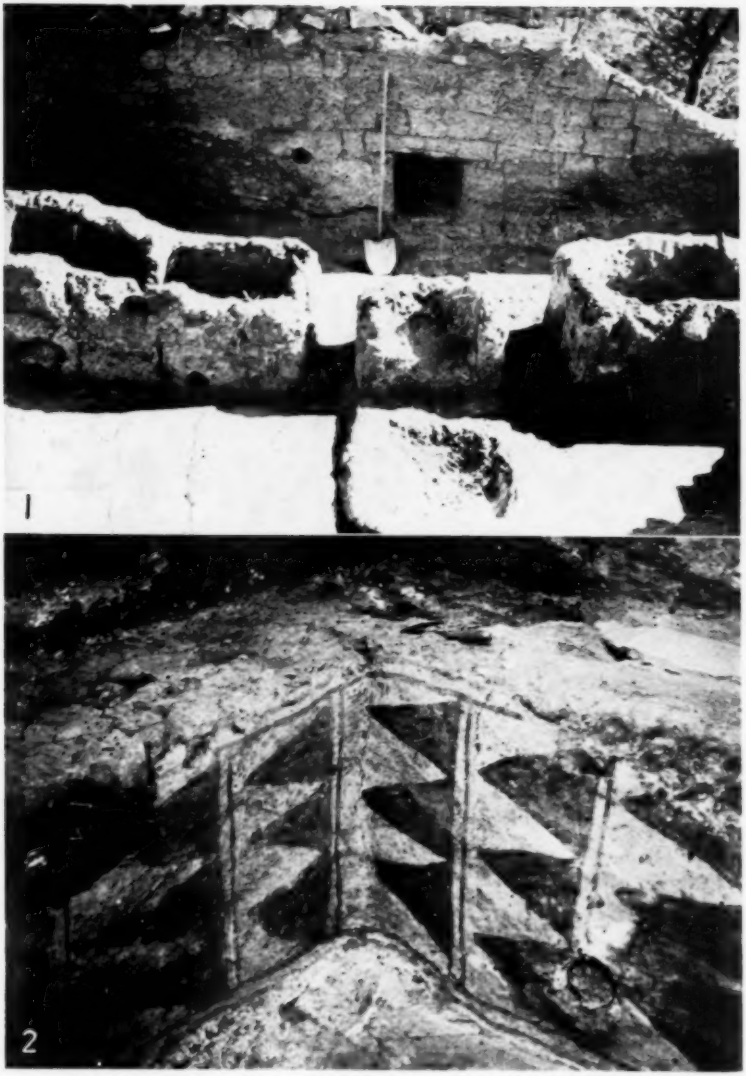

FIG. 1.—Southern portion of House 6 at Cerrito, showing arrangement of fire pit, fire screen, bins, and southern recess.

FIG. 2.—Mural paintings on bench in northwest corner of House 6 at Cerrito. A bin plug appears at the bottom (lower right).

sometimes with common walls. These walls are of considerable thickness, in some cases as much as six feet. The walls were standing, before excavation, to a height of twelve feet on the edge of the promontory, a situation which gave this and other ruins of similar nature the name of *torreones* among the natives of the Gallina country (Plate 7, Figure 1). These pretentious walls enclose rectangular spaces each of which includes a number of fixtures which appear to be standardized in position and orientation in all of the examples thus far observed.

The south side of the house was evidently the important one, and the orientation in this direction seems customary. In the center of the south wall is a cist with a wooden lintel, somewhat resembling the ventilator shaft of a kiva. Flanking this on both sides, at some distance from the back wall, is a set of bins of carefully shaped adobe jutting out from the east and west walls, respectively, but leaving a space between their ends sufficiently ample for a fire pit, auxiliary fire pit, and fire screen, also oriented south; *id est*, fire screen between fire pit and southern cist (Plate 8, Figure 1). These bins are provided with well-fitting sandstone lids, and in most cases contained corn and household utensils and implements. In a few of the most pretentious houses, these bins are augmented by other bins, situated in the northeast and northwest corners, respectively. Also, in most of the houses an adobe bench runs around the periphery of the room in that area north of the main bins. In all, the general impression of the Gallina house unit is that of a square kiva with the addition of the bins. Each of the house units at Cerrito, as well as at the other sites excavated by the pot hunters, contained these same features. In addition to these general details, there are many individual variations such as beautifully-worked mural paintings covering walls and bins in a continuous series (Plate 8, Figure 2).

One of the most interesting features, and one which has given rise to the most speculation, is the presence of holes in the bottoms of the sides of these bins next to the floor. These openings are fitted with round adobe plugs equipped with handles. Some of the bins are also provided with rows of holes along their top edges. All are thoroughly burned, as indeed are all of the Gallina houses so far examined. These perforations in the sides of the bins have suggested holes for draughts as though the bins had been used for furnaces. This suggestion unfortunately was substantiated at least in the lay mind by the presence of a peculiar slag in and near bins ferreted by pot hunters. The inevitable suggestion of smelting for gold caused a minor gold rush in the vicinity and incidentally led to the discovery of the Gallina culture. This slag was also found

in the bins of the Cerrito group, but the presence of corn seems to provide ample evidence that the bins were for storage only. The evidence of fire, of course, was probably due in each case to the fall of a burning roof.[108]

The floors and roofs of these Gallina house units are exceedingly interesting. Flagstone plays an important part in the construction of each. The floors are provided with beautifully fitting flags, some of them of very large size. The roofs were also flagged, the stones, with a shingle effect, supported on a pole-and-adobe foundation. The uprights for the houses are four in number and of unknown height. The presence in each house unit of four large-sized sandstone discs (three to four feet in diameter) in the fill of the burned roof seems to indicate their use with these upright posts, possibly as capitals. The similarity of these sandstone discs to those found in the great sanctuaries in the Chaco Canyon and at Aztec, New Mexico, is intriguing. However, their position in the fill does not admit of their use as bases for the uprights.

Access to these houses must have been through the roof by a series of ladders and platforms, as at least some of the houses were of considerable height. Evidence of such an arrangement appears at Cerrito, where the highest wall was seventeen feet and yet contained no evidence of the cross beams.

The complete incineration of all of the Gallina houses so far observed not only is an interesting point in itself but, most important of all, preserves a very clear cross section of the Gallina life with a very large collection of material-culture items. As with the pit-house unit, the cultural items are likewise most unique, and almost every implement, artifact, and ceramic piece is sharply distinctive as compared with previously known cultural products in the Southwest.

The pottery of the Gallina complex is a major consideration inasmuch as it is plentiful and of varied types. Both decorated and undecorated wares are distinct from any surrounding varieties. The carbon paint of the decorated ware seems to admit of western connections, with many San Juan indications.[109] The designs are of simple nature with a

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[108] Subsequent research has demonstrated that part at least of this slag is due to pottery vessels fused into a froth structure. This raises many interesting questions concerning the chemical constituents of the ceramics in question, and intense heat caused by burning maize.

[109] An interesting series of Gallina pottery pieces in the collection from the excavations at Aztec, New Mexico, are ample evidence of connection.

Upper row: left, elk-antler wedge or celt; right, elbow pipe with projecting "feet." Lower row: left, knife types from Cerrito; right, arrow straightener with distinguishing ridge or crest.

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multiplicity of lines recalling Chaco decorations. Especially fine are the large and gracefully formed ollas done in this decorative style. Rather small bowls and double-handled jugs are other favorite forms.

The invariable pointed bottoms of the utility ware of the Gallina Phase is one of its outstanding features. Whether these show a connection with the Woodland Pattern to the far east, or with the Navaho form, or still others, remains to be seen. Another interesting consideration in this connection is the use of the paddle-and-anvil technique in the shaping of the utility vessels.

An interesting item in connection with the narrow-necked ollas is the large number of well-formed stoppers with handles which were recovered from Cerrito. These are miniature editions of the bin plugs mentioned before.

As to items of material culture other than ceramic ware, the artifacts of the Gallina people are quite distinctive. A large series of axes has been recovered, which are all of one type. This is in general a rather large axe blade tapering to a pointed bit and with three notches so arranged as to form a T-shaped hafting around the body and also around the poll of the axe (Plate 7, Figure 2). These are of many different materials.

An artifact frequently encountered at Cerrito and observed in the other Gallina dwellings was a celt-like implement made from the beam of the elk antler (Plate 9, Figure 1). This may or may not have been hafted. Another celt or chisel-like tool was manufactured from the beam of the mule-deer antler, possibly to serve a similar purpose. This last-named implement is usually complete with one or two tines to serve as a handle for the cutting end. No other hafting is in evidence.

A fairly good series of pipes was recovered from Cerrito, and a number also observed from another Gallina ruin rifled by deer hunters. These pipes, too, are all of one type. This is a comparatively large elbow pipe of baked clay. The bowl of the pipe is flaring and bell-shaped, and the elbow is provided with two small projections or legs (Plate 9, Figure 2). Most specimens average around four inches in total length.

A most distinctive type of knife also accompanies the Gallina Phase. This has a laurel-leaf or semi-lanceolate form with one point blunted. The hafting seems to have been effected invariably on the pointed end, leaving a semi-pointed blade for cutting purposes (Plate 9, Figure 3). These are well chipped and of chalcedony. Arrow-heads and projectile points are also different from the Pueblo forms, but some of the usual types are present as well. More specimens must be recovered before any adequate statement can be made.

An implement which does not usually admit of ready classification is the arrow straightener. However, the implements of this class from the Gallina houses may be recognized in any collection. These are large (average four by eight inches), and of fine-grained schist or basalt. The implement is fitted with a crest or ridge along one side, the sides of this crest showing use for polishing or straightening the shafts. At right angles to this crest are several notches, shorter, but evidently for the same purpose. The whole implement displays a high polish (Plate 9, Figure 4).

The metates of the Gallina are flat-topped, often showing use on both faces. Manos are of the usual type accompanying this variety of metate and have rectangular, lenticular, and triangular crosssections.

Maize of both eight- and twelve-row varieties occurs in great quantities in the Gallina. House No. 6 of Cerrito contained an enormous pile of charred maize comprising some eighteen bushels. Many of the bins were also completely full of large, well-kerneled cobs charred or desiccated.

Several sandals of twilled yucca of the regular three-quarter-toe variety were recovered from a storage bin. A large section of feather cloth and a fragment of a twined bag are among the perishable specimens preserved. Coiled basketry of single- and multiple-rod variations is also present.

Evidence is continually mounting to indicate that in spite of the apparent homogeneity (?) of the present Puebloan culture and people, the culture is of extremely diverse origin. The suggestion of Woodland contact offered by the pointed-bottom pottery of the Gallina is but one indication of this diversity within the Pueblo area; Navaho admixture is not particularly indicated but deserves careful consideration. The decorated pottery and many other features give a decidedly Puebloan note to the Gallina Phase, and link it definitely with the more comprehensive Southwestern problems.

AN INQUIRY INTO THE STATUS OF THE SANTA BARBARA SPEAR-THROWER[110]

ROBERT F. HEIZER[111]

WHEN, in November 1793, Vancouver's *Discovery*, in company with the *Chatham* and *Daedalus*, lay off Santa Barbara for eight days, George Goodman Hewett, Surgeon's First Mate, had an opportunity to augment his private ethnographical collections formed during the voyage through the South Seas and along the American west coast. This collection was in private hands until 1891, when it became the property of the British Museum. At this time C. H. Read delivered to the Royal Anthropological Institute (1) a brief historical sketch of the collection and a short description of the more significant items. It is from this paper that we hear first of the Chumash spear-thrower,[112] foreshafted dart with bone barb and flint point, sinew-backed bow, and double-bladed paddle. It is the atlatl which is of primary interest. Its authenticity has been widely accepted, and I do not challenge it. Read has indicated the high probability that this specimen and the others, though lacking direct identification with Hewett's original catalog, were collected from the Santa Barbara natives. Subsequent to Read's announcement, numerous contributors to the subject of the types and distributions of the American spear-throwers have uncritically accepted this Chumash atlatl as an aboriginal type; an extremely aberrant form to be

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[110] I am indebted to Gordon W. Hewes for the drawings.

[111] Museum of Anthropology University of California, Berkeley, California.

[112] Read (Pl. 11, figs. 1, 1a) describes the specimen as "Spear-thrower of moderately hard, light-coloured wood, pierced with two holes for the first two fingers: the hook is made of a piece of bone rudely shaped. The whole seems to have been once covered with red color, now almost worn away. From the bone hook to the projection at the broad end of the implement is a shallow channel, as is usually found. This would seem to be the 'Santa Barbara throwing stick' of the MS. catalogue, both from its similarity in work to the other Santa Barbara specimens, and from the fact that the other throwing-sticks in the collection correspond with their respective numbers in the catalogue."

Dalton (P. 242, Pl. 15, fig. 7) supplements Reads' description: "Throwing stick of rather pale reddish wood darkened by some kind of red staining. On the left hand side the wood has been slightly split, but the split has been prevented from extending by the insertion of a small peg. The hook is of polished bone, and in a line with it is a groove running down the centre of the board and slightly constricted in the middle. On each side of the groove is a large circular hole for the insertion of the fingers. On the back are one or two small patches of asphaltum. Locality. Santa Barbara. Length. 15 cm. Breadth at broadest part. 11.5 cm.; same at end 4.5 cm. Thickness 2.5 cm."

sure, yet implicitly indigenous. I propose here to question the feasibility of this interpretation of the Chumash atlatl.

At first glance it is, to say the least, unusual that no mention of the spear-thrower is to be found in the voluminous Hispanic records of the Chumash area, and in particular of the Santa Barbara region which is so well documented. Although numerous wooden objects such as knife handles, plank-canoe fragments, and wooden "swords" have been recovered from archaeological sites of the Santa Barbara region (2), not one wooden atlatl has come to light from deposits indicative of relative recency. On the other hand, bows and arrows are mentioned frequently in the early sources.

FIG. 14.—Spear-thrower from Lake Patzcuaro, Mexico (after Starr).

Dalton (3), in 1897, first interpreted at some length the Hewett specimen which had been introduced to science in 1891 by Read. The comparative literature was by then rather extensive and Dalton suggested the typological relationship of the Santa Barbara atlatl with the Mexican type by calling to attention two main points: (1) the shortness of the specimen and the groove running from the spur along the body to the grasping end, and (2) the two finger holes in lateral orientation (Figures 14, 15). It is important to note that Dalton accepts this as a true autochthonous type, for subsequent authors concur with him and his interpretation. Krause (4), in 1902, published an excellent study of the atlatl and relates the Chumash atlatl to the short Mexican types described by Nuttall (5) from the codices, and by Frederick Starr (6) from Lake Patzcuaro where the atlatl is in actual use to this day.[113]

Mason, (7) in a short note on the Hewett collection, says: "But the interesting novelty among the objects described is a throwing-stick from Santa Barbara Islands, on the California coast, the length being given as 5 1/8 inches. Now, if the shaft of this specimen could be elongated to 20 inches, and the projection between the finger holes extended to about 4 inches, the specimen would be absolutely identical to

[113] Saville, M. H., The Wood-Carver's Art in Ancient Mexico. MAIHF-C 9, 1925. In this paper (p. 42) is a mention of recent investigations which indicate a rather widespread use of the atlatl in Mexico in post-contact times.

one . . . from Lake Patzcuaro, Mexico . . . " Figure 14 shows a Lake Patzcuaro specimen taken from Starr (6: pl. 15, fig. 2a). It measures 550 mm. in length, greatest width 64 mm., length of handle 115 mm., greatest thickness 15 mm. Without much doubt it appears that these affinities are valid, typologically and technologically speaking.

It is a fact that Santa Barbara was under Spanish and Mexican influence for a period of at least 250 years before Vancouver's ship entered the channel. The first navigator to visit the Santa Barbara region was Cabrillo, in 1542, who spent much time there and whose account gives village names and other information on the Chumash along the coast. Vizcaino, who coasted California in 1602, had contacts with the Santa Barbara channel region. The Portolá expedition of 1769–1770 is known from the excellent diaries of Fages, Crespi and Costanso, all giving very full information on the Chumash. Font's diary of the Anza overland expedition of 1774 has yielded much important ethnographical information on the same people. In 1782, the Presidio of Santa Barbara was founded, and four years later, in 1786, Mission Santa Barbara was established by the indomitable Lasuen. So much for an over-condensed regional historical summary (8). These major expeditions are mentioned to give an idea of the frequent and intimate contact which the Chumash had with the Mexican Spanish for 250 years prior to Vancouver; slight and infrequent at first, but later with greater frequency and culminating in actual settlement in 1782, eleven years before Vancouver's visit.

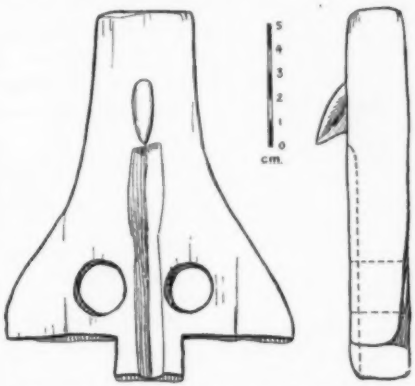

FIG. 15.—Front and side view of the Santa Barbara spear-thrower (after Read).

Dr. H. E. Bolton, the authority on Hispanic conquest and settlement, has much evidence indicating that the Mexican Tlascalans and Tarascans were used as colonists, and that many were brought into northern Mexico to form nuclei for buffer communities. It is highly probable that the sea expeditions cited above carried crews composed, in part, of native Mexican Indians, and it is known that the land expedi-

tions which started from Baja, California, and the adjacent mainland recruited much of their personnel from the natives in the immediate vicinity, some of whom may have been these southern colonists or such people as the indigenous Seri. I suggest that, in view both of the historical facts presented above and its unique and solitary occurrence at Santa Barbara in California, that the Chumash atlatl conceivably may ultimately be ascribed to an alien source. In material and general technology it appears that the particular one in question was almost certainly made at Santa Barbara. All I am proposing is the possibility that this type of projectile weapon (and this view is supported by Dalton's and Krause's interpretations of Mexican affiliations) may not be *in propriâ personâ* at Santa Barbara, and that perhaps its presence may be due to historical (specifically, historic) factors such as, for example, the introduction of the idea by Mexican natives associated with the Spanish in California from 1542 on. Kroeber (9) has struck the keynote when he says: "A determination of their wood [i.e., of the atlatl, harpoons and bow] promises to be particularly convincing." The possibility of introduction by Russian or Aleut sea-otter hunters is not to be entertained, since they did not begin hunting on the California coasts until 1803 (10).

In closing, it may be well to state briefly the indications and evidence which might controvert the suggestion of the preceding section. The distinctness in specific form and the manufacture of this particular specimen at Santa Barbara (use of asphaltum, technology, red stain, and so on) are both indicative of its possibility as a true local type. Olson (11) notes the absence of small arrow-points and, inferentially, the bow at one Early Mainland site (No. 2). Rogers' (12) presentation suggests that his earliest culture (Oak Grove) made flint points too large to be used on arrows and which represent, presumably, either spear or atlatl dart points. Thus there is presumptive evidence that in the Santa Barbara area at one time (the bow being absent) the atlatl was the type projectile weapon. This, in the light of similar atlatl-bow sequences in the Southwest, Great Basin, and Central California, is not only a sound inference but, it seems to me, a distinct probability. Therefore, it might be argued that the Vancouver (or Hewett) spear-thrower represents a survival. I should be very cautious about accepting this, however, since the bow is well known to have been the primary weapon, and in none of the adjoining areas have we any evidence of the survival of the atlatl into historic times. Kroeber (13) says (p. 382): "It is not unthinkable that the solitary spear-thrower recorded from California, the Santa Barbara specimen brought home by Vancouver, which is so strikingly aberrant in form, represents a survival somehow connected with what

happened in this potteryless tract [i.e., the highland of Tehachapi to Santa Barbara]." The implication is that the area mentioned has an essentially separate historical background, certain influences which affected neighboring regions failing to register here. The question of the presence of the spear-thrower in northern Mexico has been approached by Beals (14). The Waicuri and Tarahumare references (p. 197, Map 21), as indicating the atlatl, are very questionable.

The problems proposed here are very real ones in the light of increasing evidence pointing to the general succession of the bow to the atlatl in aboriginal North America. The cases of survival into historic times of the atlatl are of the utmost importance, but let us be certain that they are true survivals before too much weight is given their importance.

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FACTS AND COMMENTS

THE PROBLEM OF THE "PLUMMET-STONE"

The problem of the "plummet-stone" is a general one, as can be seen from its widespread distribution. They are found in New England, the Middle Atlantic States, Florida, West Virginia, Ohio, Illinois, Wisconsin, Iowa, Missouri, Kentucky, Arkansas, Alabama, Louisiana, California, and it would seem that they are likely to occur in other localities in the United States. They also have been recorded for all eastern Canadian provinces as well on the Northwest Coast. In addition, the Eskimo in many cases have "plummet-stones" which in instances are very similar to the bola stones.

The specimens I shall consider may be described as pendants. These vary from straight, long, narrow forms to elliptical or nearly lozenge shapes, and from about one inch to more than six inches in length. Their weights vary from several ounces to a pound, although there are references to larger ones. These interesting objects are usually made of stone, but specimens of shell, bone, ivory, hematite ore, and copper are also found. What they were used for is one of the problems of archaeology. They have been called pendants, plummets, ear ornaments, fish-line sinkers, and fish-line lures, to mention but a few of the suppositions advanced (1).[114] In the present paper I should like to present some ideas as to their origin and use, made on the basis of the traditions of some of the northern Indians who are familiar with these objects.

The question of "plummet-stones" involves more than the mere decision of function. It involves the native information which is available. Mr.Charles Willoughby (2) in his recent book sees fit to rely on a native informant, Big Thunder by name, who claimed that these objects were used as fishing lures. Whether Mr. Willoughby knew it or not, Big Thunder was a Penobscot Indian with a notorious reputation, by no means considered reliable by investigators of his day. In view of the interest awakened by the examination of evidence regarding the use of "plummets," it would seem appropriate here to inquire into the circumstances affecting the value of Big Thunder's testimony.

Only very recently Mr. Edmund B. Delabarre (3) recorded in a short article many of Big Thunder's shortcomings. Big Thunder's English name was Francis Loring. The Loring family is well known among the Penobscot Indians of Oldtown, Maine, where he lived and died. One of his favorite stories was that he was a Wampanoag Indian and that he had the entire history of this tribe written down in a book made of skins. However, nobody ever saw this book and when questioned about it years ago he said it had been burned up in a fire. Furthermore, the name Loring is not known among the Wampanoag. The title of "chief" was his own invention. Another point which stands against the authenticity of his knowledge is that he was in the show business for many years and always gave the "best story" which he could think of. Quoting

[114] See Table 1, taken from Peabody's article listed in bibliography.

from Mr. Delabarre's paper, "He was a show-man in every sense of the term. He was a most unreserved liar and no secret was made of it among the Penobscot. His business was the deception of the public. He had a little relic shop on Indian Island where he sold "ancient relics" which he manufactured, and I have encountered many stories and traditions which were his own invention. Among them must be included the 'ancient book' hoax. In short, 'Big Thunder' was a joke among all who knew the Indians." Mr. Delabarre got much of this information from Dr. Speck. Mrs. Fannie Hardy Eckstorm, who has done much work among the Indians of Maine, has written several criticisms of Big Thunder.

If Big Thunder is to be relied upon at all, one would have to judge in his favor the one fact that he was a member of the tribe, lived among the Penobscot Indians, and must therefore have some knowledge of ancient Penobscot customs, whether he wanted to lie about them or not. Had he been a white field worker, his statements would be worth no more than those of a Maine lumberjack. These facts must be weighed in judgement. It is possible, on the other hand, that Big Thunder heard other old men mention the use of plummet-stones; hence it might be that he was telling the truth in this instance.

Quoting from Mr. Willoughby's book: "Another similar account was given me by Mr. Langdon Warner of Cambridge who obtained it from two Ojibwe Indians, Tom Oblossawa and George Cabausa, of Garden River Reservation, Lake Huron about the year 1903. He was told that the pendants were covered with lard and held near the lake bottom for catching pickeral and pike."

Dr. Speck also informs me that in 1903 he knew a certain Ojibwe named Cabausa who was at the time one of the guides appearing in the New York Sportsman's show. At the same show were a group of Penobscot Indians. Could it be that the "plummet" information given by the Ojibwe at that time had any relation to the presence of the Penobscot men there? Mr. Langdon Warner could probably clear up the haze which surrounds this association of peoples. Cabausa again is the type of Indian with whom the field worker must be very careful.

We may now consider the data which are forthcoming from Penobscot sources, including Big Thunder himself, and at the same time testified to by other elderly Penobscot men before 1900 who knew Big Thunder but who would not have drawn their knowledge from him since they knew of his mendacity.

From Dr. Speck's (4) manuscript notes written in 1912 I have taken the following statement relating to the Malecite-Penobscot beliefs in regard to the "plummets." "Another ancient device that I was told of was that of plummet shaped stones covered with tallow and attached to a line as a gorge-bait for large fish. The fish, would swallow the stone and could be pulled in before disgorging it. I only mention this at the suggestion of those older Indians (Newell Lion, Joe Hemlock, Peter Nicolar, Horace Nicolar, and Louis Nicholas, a Malecite), who informed me of it in explanation of the pear- or plummet-shaped stones so common on prehistoric sites of this area. The same stones have been

variously designated as ear- and nose-ornaments and still more plausibly as bird sling-stones."

Roland Nelson informed Dr. Speck that he had heard all these theories advanced by his father and old Piel Sak, wiseacres of the tribe who have been dead for many years. It is apparent that these beliefs were more or less prevalent as a tradition among the Penobscot. Roland Nelson points out in addition that the use of a white-tallow lure would affect the carnivorous fish as an inducement to bite and swallow the object. It will still require the observation of other experienced fishermen in the northern waters to test this assertion.

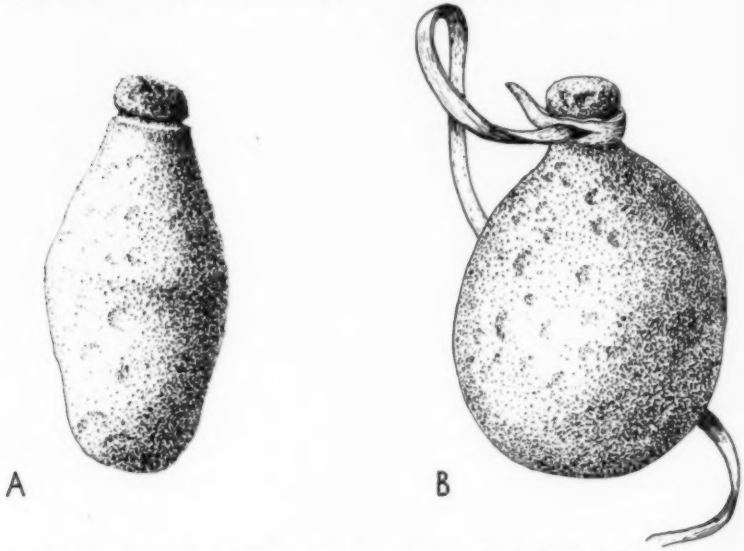

FIG. 16.—So-called "plummet-stones" obtained by F. G. Speck from Penobscot Indians (1912) on Indian Island, Maine; in the Museum of the American Indian, New York City.

The explanation of the "plummets" as slingstones was also offered Dr. Speck as an alternative, by the informants named above. Newell Lion attached a leather thong to one of them to illustrate his idea of its use (Figure 16). In this instance Big Thunder was probably telling the truth, as he spent much of his life at Oldtown. He undoubtedly did learn some of these old traditions from reliable men of his tribe.

Beauchamp (5), in his bulletin dealing with polished stone artifacts, has the following information which may prove of interest here. He seems to feel that the use of "plummets" is somewhat local to New York. He states: "A very in-

teresting class of stone implements is that of the plummets, which are somewhat local in New York. They have a very moderate distribution here, but probably Brewerton, at the foot of Oneida Lake, has furnished more than all the State beside. Even there they mostly occur in a very limited area. They are not rare about Onondaga Lake, and these are the two localities of Central New York. Local specimens differ much from those of the West. It has been surmised that they had a superstitious use, but here they seem confined to good fishing places, and may well be classed as sinkers, although some of them seem hardly fitted for this use" (Figure 17). This would seem to substantiate the evidence that "plummets" were used in fishing.

FIG. 17.—"Plummet-stone" found at Haddonfield, New Jersey, by the late James L. Pennypacker.

Jenness (6), in a recent article, has made a suggestion, which has been gaining momentum each year, that certain traits, namely: semi-lunar knives, soapstone pots, plummets, bone harpoon-heads, and several other articles, have been traded to northern Indians who have in turn traded them farther south among other Indian groups. It is very possible that we shall have to look among early Eskimo remains before any definite conclusions can be reached. At present it would seem to me that "plummets" were used in connection with fishing, but just how they may have been employed cannot be answered until more information is available. Schoolcraft (7) says that he saw them in use among the Pennacook Indians and that they were using them as sinkers. He also mentioned plummet shaped stones attached to a drum and used as beaters, but this information seems to have little value as regards the problem.

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TABLE OF PROPOSED USES OF "PLUMMET-STONES"

I. In connection with fishing.
1. Drag-line sinkers.
2. Fishing-line sinkers (above hook).
3. Fishing-line sinkers (below hook).
4. Net sinkers.
5. Bait and hook combined.

II. In connection with the chase or warfare.	6. As slingstones.
	7. As black-jacks.
	8. As bolas.
III. In connection with textiles.	9. Twine or sinew twisters.
	10. Spinning weights.
	11. Netting weights.
	12. Weaving weights.
IV. In connection with hitting or grinding.	13. Hand pestle.
	14. Hanging pestles.
	15. Paint stones.
	16. Rubbing stones.
	17. Hammers.
V. As ornaments.	18. Ear ornaments.
	19. Simple pendants.
VI. With superstitious significance.	20. Amulets.
	21. Charm stones.
	22. Lucky stones.
VII. As drum-rattles.	
VIII. As true plummets.	
IX. As game stones.	
X. In connection with phallic worship.	

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THE WICCOMISS INDIANS OF MARYLAND[115]

That part of Maryland which lies east of the Chesapeake Bay has always, since the founding of the colony (1634), been known as the Eastern Shore; so,

[115] A continuation of these notes on the Wiccomiss Indians will appear in a subsequent issue of this journal.

too, the Eastern Shore of Virginia. Most of it is a flat country of tidal rivers occupying "drowned valleys" into the heads of which flow sluggish freshwater streams. A low divide, or height of land, separates streams emptying into the Chespeake from streams flowing into the sounds of the Atlantic Ocean, or into Delaware Bay.

In earliest colonial times this part of Maryland was inhabited by several Indian peoples, all probably of Algonquian stock. The best known are the Nanticoke, who lived in the southern part of this territory. The Assateague occupied the seaboard side. The Choptank had several towns on the south side of Choptank River. In the southeastern part of the Maryland Eastern Shore were various numerically small peoples: Manokin, Annamessex, Pocomoke, Nasswattox and others. About 1671, the last named peoples huddled together for protection in a neck of land called Askiminikonson, lying between the Pocomoke River and a branch known as Nassawingo Creek. Their town in its day was the largest Indian town in Maryland known to white people. Lastly, there were the Wiccomiss. This list does not include those Indians who resided on Delaware Bay in what is now the state of Delaware.

The principal Indian potentate of the Maryland Eastern Shore was the "Emperor" of Nanticoke. The "king" of the Assateague is also sometimes styled "emperor."

The student of the Indians of this part of Maryland has hitherto, apparently, found himself "up against a stone wall," when he attempted to identify the Indian peoples who may have dwelt in that section which lies to the northward of Choptank River, at the time of the founding of Maryland and later. Captain John Smith, during his famous voyage of discovery to the head of Chesapeake Bay, in the year 1608, explored (probably) the North East, the Elk, the Sassafras, the Nanticoke and the Pocomoke rivers. On what appears to have been the Sassafras River he discovered the Indian town of Tocwogh, which had one hundred warriors. Farther south than Tocwogh, so he tells us, was the Indian town of Ozinies, having sixty fighting men. On his map he locates this town in a sort of bay, which, seemingly, could not have been other than the mouth of Chester River.

So far as I am aware, the Archives of Maryland do not enlighten us as to any relations, friendly or otherwise, which may have been formed between the Government of Maryland and Indians who are specifically described as residing anywhere north of Choptank River on the Eastern Shore, in the neighborhood of Chespeake Bay, during the early colonial period; but Maryland made a treaty with Indians called "Monoponson" in 1659, and Monoponson was an Indian name for Kent Island.[116] Before the founding of Maryland, Captain William Claiborne purchased Kent Island from the Indians,[117] after which event

[116] Maryland Archives, Vol. 3, p. 362; Narratives of Early Maryland, Clayton Coleman Hall, Editor, 1910, pp. 88, 89, 446, frontispiece, Map of Maryland, 1635.

[117] Maryland Archives, Vol. 3, pp. 29, 32.

the Indian inhabitants of the island probably moved off.[118]

Indian place-names are almost unknown in the territory north of the Choptank in Maryland. One or two survive for Kent Island. Land records[119] of these parts contain no mention of Indian towns. Indian paths, indeed, are called for in various Talbot County land-grants, as well as one or two Indian fields and occasionally Indian cabins. I have deposited with the Smithsonian Institution records of two "Indian bridges," which were situated in this county, as well as of a place called "Indian Bridge Neck." As for the land records of more northern counties of the Eastern Shore, particularly, Queen Anne's and Kent, they are almost eloquent in their silence on these subjects. Nevertheless, the important Indian road known as the Old Choptank or Delaware Path traversed these counties, as I have shown in a recent bulletin of the Archaeological Society of Delaware.

In addition to Captain John Smith's account of the towns of Tocwogh and Ozinies, and in addition to the scanty evidence of the land records mentioned above, we have, for the fact of the occupation of this part of Maryland by Indians in historical times, the testimony of a certain Plantaganet Plowden, a gentleman enthusiastic for the opening up of fair lands to settlement, but not for this reason alone to be set down as a liar. In his *Description of the Province of New Albion*, which was published in the year 1648, Plowden, among various sites near the head of Chesapeake Bay which he esteemed to be especially desirable for white settlers, describes a place which he calls "Mount Royal," or "Bolalmanack Hill." It is five miles from Palmer's Island, an island near the mouth of Susquehanna River, now known as Watson's or Garrett Island. " . . . here is a clear Indian field sixe miles long to plant and plow rich land, and as well stored as the rest, and under it is Elk river, having many branches navigable . . . "[120]

Possibly Plowden's great Indian field was the same as that which is called for in a land-grant of forty years later. This grant was made to Augustine Herman, the Lord of Bohemia Manor and the author of the best early map of Maryland and Virginia. It was called "The Misfortune," and was laid out November 14, 1678.[121] "The Misfortune" contained 1309 acres and lay upon

[118] In his *Aboriginal Maryland* (Maryland Historical Magazine, Vol. XIV, p. 163), Dr. Raphael Semmes has it that Kent Island was inhabited by the Matapeke Indians, who lived at Indian Spring but later removed to Matapax Neck in the southern part of the island. Claiborne, in 1631, found about one hundred of them, but by 1641 they seem to have disappeared. I do not find these Indians in the index of Dr. Semmes' recently published work, *Captains and Mariners of Early Maryland*, a large part of which is devoted to a discussion of the Indian tribes of this state.

[119] There are no descriptions of patented lands earlier than 1658, except for Kent Island.

[120] Plowden, Plantaganet, Description of the Province of New Albion, in Force's Historical Tracts, 2, p. 28.

[121] State Land Office, Annapolis, Md., Patents, Liber 21, folio 365.

Bohemia Back Creek, a head creek of Bohemia River, the principal branch of Elk River. One of the lines of this land runs north 420 perches "to the head of the Western Run of Judiths Creek . . . including a plain suppose to be an old Indian field."

Plowden probably exaggerated the size of his Indian field, but if it was half so extensive as he declared it to be, it was certainly significant. It was not, of course, the site of Tocwogh, since that place was not situated on Elk River but undoubtedly was on the south side of the Sassafras.

The Wiccomiss Indians (Wicomese, Wicomick, Wickamiss, Wiccomisso, etc.) were persecuted and dispersed by the Government of Maryland. By historians they have been overlooked, or confused with the Wicomico (for this error the Maryland Archives are partly to blame) and relegated to a hypothetical home on Wicomico River (Eastern Shore). They may have been the people of Tocwogh. It is much more likely that they were the inhabitants of Ozinies. On a map of Maryland, dating from 1635, the work of T. Cecill, which was drawn to illustrate the anonymous *A Relation of Maryland*, the town of the "Wicomese" is shown as situated at the head of a deep indentation of the eastern shore of Chesapeake Bay. The upper end of this indentation, or deep bay, is half way between the island marked "Monoponson" (Kent Island)[122] and the mouth of Susquehanna River.[123] As regards the contours of Chesapeake Bay and its estuaries, this map apparently follows Captain John Smith's map, and in virtually the same place where Smith locates "Ozinies," Cecill has "Wicomese." The name "Monoponson" does not appear on Smith's map. Cecill has added this name, while copying most of Smith's errors of topography. He must have had information that the "Wicomese" town lay north of Kent Island. Perhaps, too, he had heard that it was the "Ozinies" of Smith's narrative and map. Cecill's map shows no other Indian towns on the Eastern Shore. The explanation of this fact is that the map illustrates the text. The author of *A Relation of Maryland* (1635) has nothing to say of Nanticoke. Of the "Wicomesses" he tells us that they were then enemies of the Susquehannock, and relates how, a year before, members of these tribes, coming to trade "at the Island of Monoponson, where Captaine Cleyborne liveth" (Kent Island), encountered each other and fell into a dispute, as a result of which misunderstanding the "Wicomesses" lay in ambush for the Susquehannock and killed five of them, later slaying several of Captain Claiborne's people. To excuse this incident, the "Wicomesses" sent to the Governor at Saint Mary's a Patuxent Indian, who lived among them, having, as he testified, "married a wife amongst the Wicomesses."[124]

[122] Cecill's map shows another island between "Monoponson" and the mouth of the bay on which he places "Wicomese." This bay cannot be other than the mouth of Chester River; but, in reality, the upper part of Kent Island lies at the mouth of this river.

[123] Narratives of Early Maryland, frontispiece.

[124] *Ibid.*, pp. 88–89.

The independence of the Wiccomiss Indians did not endure for many years after this affair. Plantaganet Plowden, writing in 1648, in his *Description of the Province of New Albion*, says: "The Sasquehannocks are not now of the naturals left above 110, though with their forced auxiliaries the Ihon a Does and Wicomeses they can make 250."[125] The "Ihon a Does" are supposed to have been Juniata.[126]

In 1669, when Maryland was prosecuting its final war against the Wiccomiss it was reported that these Indians "have drawne into League with them the Mathwas Indians and others."[127] The Mathwas, of course, were the Delaware.[128]

In the year 1652 the Susquehannock ceded to the Government of Maryland the whole of the Eastern Shore as far south as Choptank River.[129] If the Wiccomiss Indians had lived north of this river, their conquest by the Susquehannock explains how the latter people were enabled to make so sweeping a concession.

Besides the evidence furnished by Cecill's map of 1635, other facts seem to show a connection between the Wiccomiss and the northern parts of the Eastern Shore. In 1683, a certain Thomas Vaughan addressed a letter to John Llewellyn, Commissioner of the Land Office, alleging that Colonel Vincent Lowe, one of the leading men of the Eastern Shore, used his influence to prevent people from taking up valuable lands in those parts, which he himself coveted. Vaughan requested Llewellyn to "get Mr. Jones to return a certificate" for six thousand acres "according to these lines . . . beginning at a marked Red Oak standing by the Wiccomise or Whorekill Path neere the head of Sassafras River."[130] This land was never surveyed. A few days before this letter was written, June 21, 1683, Colonel Lowe took up "Ladys Delight," 3000 acres, lying in Cecil County at the head of Sassafras River in the woods "near the Whore Keel path."[131] This land lies in Newcastle County, Delaware, where the head branch of the Sassafras rises.[132] In 1710 a certain William Boyer, testifying about the bounds of "Ladys Delight," asserted that he had known the Whorekill Path twenty-four or twenty-five years.[133]

If we may judge by its name and by the facts presented above, the "Wicomisse" or Whorekill Path was a path used by the Wiccomiss Indians, which connected the head of Sassafras River with the district formerly known

[125] Force's Historical Tracts, 2, p. 24.

[126] Handbook of American Indians, Bulletin 30, Bureau of American Ethnology, 1, p. 637.

[127] Maryland Archives, Vol. 2, p. 196.

[128] Maryland Archives, Vol. 5, pp. 153, 269.

[129] Maryland Archives, Vol. 3, p. 277.

[130] Maryland Archives, Vol. 17, p. 174.

[131] Cecil County Rent Roll, Calvert Papers, folio 123.

[132] Pennsylvania Archives, Vol. 16, 2nd Series, p. 737.

[133] State Land Office, Annapolis, Md., Chancery Proceedings, Liber P. C., 1671–1716, folio 716.

as the Whorekills, that is, the country in the immediate neighborhood of Cape Henlopen, at the mouth of Delaware Bay. Lewes Creek, the creek where the town of Lewes is situated, was formerly known as Whorekill Creek. There was an Indian town at the Whorekills. In his account of New Albion, 1648, Plantaganet Plowden extols a site which he calls "Roymont," situated at the "Horekills," where, he tells us, " . . . there is a poor Indian (tribe) of fourteen men only and weak to hinder any."[134] There may have been a greater number of Indians in this town than he admitted, since he was interested in minimizing the dangers of settling the place. In 1677, the Indian town at the Whorekills was called Checonnesseck. It was not a Wiccomiss town.[135]

A stream called the Wickomis or Wiccomis Branch, one of the headwaters of Chester River, is called for in the certificate of survey of a tract of land called "Batchellors Plain," laid out for Robert Smith, December 18, 1676.[136] It is mentioned in the will of Thomas Joanes, September 10, 1680,[137] in the certificate of survey of "Jones Addition," laid out for Nathaniel Tucker, April 2, 1710,[138] and in the certificate of survey of "Forlorn Hope," laid out for Col. Richard Tilghman, August 5, 1722.[139] The description of "Resurvey of Forlorn Hope Rectified," surveyed for Edward Tilghman, March 9, 1746, serves to identify it.[140] It has been known for a great many years as Sewell's Creek, and forms the boundary between Kent County and Queen Anne's County, Maryland, to the Delaware line. It rises in Kent County, Delaware.

Numerically, at least, the Wiccomiss Indians seem to have been among the three or four important Indian peoples of eastern Maryland. We must reckon with the Wiccomiss when it is a question of the identity of Indian remains found on the Eastern Shore of Maryland, in the neighborhood of Chesapeake Bay, between Kent Island and Sassafras River, or from the head-waters of Chester River southward along the divide between waters flowing into Chesapeake Bay and the heads of Delaware Bay rivers, as far south as Wicomico River; and more particularly, in that neck which lies between Chicacone Creek and Nanticoke River. In historical times, at least, they appear to have been the Indian inhabitants of those parts, although their connection with the region and place last named is better established than their residence in the territory first mentioned. That they were the people of Tocwogh is but a surmise. That they were the people of Ozinies is a theory which rests upon the facts above recited. I believe that they were, in fact, these same people. Ozinies, in my opinion, was not deserted between 1608 and 1634, but later than 1634, though, perhaps, not by more than a decade. Relentless persecutions, emanating from

[134] Force's Historical Tracts, 2, p. 25.
[135] Maryland Archives, Vol. 15, p. 146.
[136] Land Office, Annapolis, Md., Patents, Liber 21, folio 544.
[137] Baldwin's Calendar of Wills, Vol. 2, p. 98.
[138] Patents, Liber D. D. No. 5, folio 832.
[139] Patents, Liber I. L. No. B. folio 157.
[140] Patents, Liber B. Y. & G. S. No. I, folio 122.

the English colony at Saint Mary's, near the mouth of the Potomac, drove its inhabitants into the backwoods at the heads of tidal rivers to join there, possibly, kinsmen already seated in those places. Thither, after a respite of no more than twenty years, they were pursued, and there they were massacred or made prisoners, and so came to an end as a separate people. Ozinies, by the way, was the name of a place in Virginia. Chicacone was the name, not only of an Indian town in Maryland, but of an Indian town in Virginia.

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A NOTE ON CORNER-TANG ARTIFACTS

In 1936 a monograph appeared dealing with corner-tang artifacts (Bibliography, 1). Although nothing definite is known as yet about the age and associations of these peculiar artifacts, the author believed them to have developed from spear-points and to have been associated with the chase (skinning knives ?). He furthermore concluded from certain indications that these artifacts belonged to an early horizon. Typologically he distinguished six sub-types (Figure 18).

In a recent perusal of archaeological literature for a different purpose, the occurrence of these corner-tang artifacts was noted, resulting in a considerable extension of the range of these implements. The distribution is listed in the following table wherein the numbers given under "Reference" refer to the titles in the Bibliography.

No. Site	State	Reference	Sub-type
1. Terry, Prairie Co.	Montana	2	Diagonal Corner-Tang
2. Guernsey, Platte Co.	Wyoming	3, p. 52	Diagonal Corner-Tang
3. Sterling, Logan Co.	Colorado	3, p. 52	Mid-Back-Tang Knife
4. Ft. Collins, Larimer Co.	Colorado	3, p. 52	Mid-Back-Tang Knife
5. La Jara, Conejos Co.	Colorado	4, p. 159, fig. 153	Diagonal Corner-Tang
6. Lamar, Prowers Co.	Colorado	3, p. 52	Mid-Back-Tang Knife
7. Taos, Taos Co.	New Mexico	2	Back-Corner-Tang Knife
8. Las Cruzes, Dona Ana Co.	New Mexico	2	Various
9. Pontotoe Co.	Mississippi	5, fig. 58	Base-Corner-Tang Knife
10. Riley Co.	Kansas	6, p. 83, fig. 106	Base-Corner-Tang Knife
11.	Oklahoma	1, p. 22	Two artifacts
12. Bowie Co.	Texas	7, p. 156, fig. 218	Base-Corner-Tang Knife
13. Seventy Counties	Texas	1, p. 19; Table 1; p. 20, Text-Fig. 3	All sub-types, 526 artifacts
14.	Wisconsin	8	Back-Corner-Tang Knife
15. Cedar Co.	Missouri	1, p. 28	Five artifacts
16. Havana, Yell Co.	Arkansas	9, p. 4, fig. 2; p. 20, fig. 10	Diagonal Corner-Tang
17. De Soto Co.	Louisiana	6, p. 371, fig. 552	Diagonal Corner-Tang

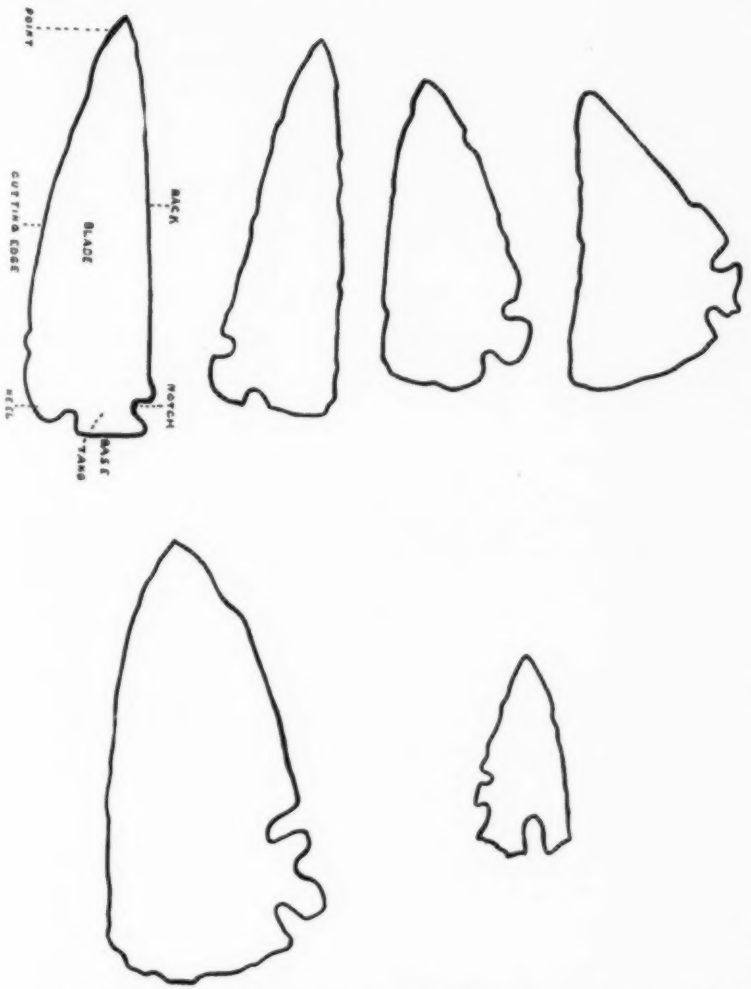

FIG. 18.—Shape types of corner-tang artifacts, after Patterson. Upper row, left to right: base corner-tang knife; diagonal corner-tang knife; back corner-tang knife; mid-back corner-tang knife. Lower row, left to right: bifurcated-tang knife; two-tang knife.

18. Berks Co.	Pennsylvania	6, p. 199, fig. 296	Base-Corner-Tang Knife
19. Cañon City, Freemont Co.	Colorado	9, p. 117, fig. 57	Mid-Back-Tang Knife

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IMPLEMENTS FROM LAKE MOHAVE

Archaeological reconnaisance work along the ancient shore lines of desiccated Lake Mohave, located south of Death Valley in California, has been interpreted by Mr. and Mrs. Campbell and their associates.[141] Groups of implements were found along the old beach line located above the present playa. These were found at approximately the same vertical elevation. Most geologists, including D. G. Thompson, O. E. Meinzer, and E. Antevs, are concurrent in the belief that the desiccation of this lake took place in late Pleistocene times; although Thompson believes the antiquity to be uncertain.[142] The age of the lake, together with neighboring lake beds which are also desiccated, was interpreted by geologists before archaeologists became interested in the problem; however, it is possible that the groups of implements found exposed in the beaches might be considerably younger than the Pleistocene phase of the lake's existence. The presence of modern camp sites containing materials typologically different than those mentioned above was determined at the southern portion of the lake near existing or recent springs.

Mr. Charles Amsden's excellent analysis of the implements on the ancient shore lines shows that there is at least a superficial similarity to Paleolithic

[141] The Archaeology of Pleistocene Lake Mohave, a Symposium by E. C. Campbell, W. H. Campbell, E. Antevs, C. A. Amsden, J. H. Barbieri, and F. D. Bode, Southwest Museum Papers 11, June, 1937.

[142] A short but excellent resume of bibliography on the interpretations of the geologists is given on pp. 25–32.

implements from Europe.[143] It is pointed out that many of the implements have Aurignacian and Solutrean resemblances. Judging from the illustrations, the graver facet and the fluting technique are notably found in association as they are in Aurignacian deposits in Europe. Aurignacian forms include the keeled scraper, round scraper, end scraper with retouch on one surface only, and the graver drill. The Solutrean resemblances are mainly represented by the leaf-like blades. Mousterian resemblances are also to be found in pointed scrapers. However, it would be very difficult, if not impossible, to select a site in Europe which would have proportions of types similar to the Mohave assemblage. The ensemble of cultural materials here certainly cannot be said to correlate statistically with any site in Paleolithic Europe. It would be better to reserve the postulation of cultural relationships until statistical analyses of resemblances are made and until we have more excavations from areas intervening. Nevertheless, the striking resemblances rightfully demand that we use such descriptive terms as are used for similar implements from Europe. Furthermore, there are many implements which have no counterparts in Paleolithic Europe, as the Silver Lake point, the distinctive Lake Mohave point, and perhaps also the Yuma and the Folsom points.

The typological argument for antiquity is not very sound. The Australian aborigines make perfectly good Upper Paleolithic implements out of telegraph insulators. The secondary evidence of patination would seem to argue for antiquity. In Europe and Africa the most reputable investigators have found that patination is consistently found on Paleolithic implements and almost as consistently is lacking on Neolithic implements. If a bone is found highly mineralized or an implement highly patinated, they would have little hesitancy in assuming antiquity, if these criteria are used in conjunction with others. Conditions for the rapid production of mineralization or patination occur probably in a relatively few instances. Nature is less consistent than the chemical laboratory.

It might have been clearer to the reader if the locations of implements had been marked on the contour map and a short summary added, giving the relative proportions of all implements found from each location.

This book is a valuable contribution to the literature of North American Archaeology. It is magnificently illustrated and is supplemented by a profuse bibliography. The authors are very thorough in explaining all aspects of this archaeological problem.

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[143] Pp. 51–98.

CORRESPONDENCE

Arrow-Heads or Dart Points

Mr. Browne is quite right in taking exception[144] to my ex-cathedra statement[145] (for which the co-author, Mr. Baker, was not responsible) that the large heavy points which occur, to the seeming exclusion of small light ones, in the more ancient New World archaeological sites, were used for the tipping of spear-thrower darts. Dicta of this sort, once in the literature, often become dogma, to the detriment of further inquiry.

My reasons for expressing the above belief regarding the large points were: (1) that all prehistoric stone-headed arrows so far found in the Southwest bear points weighing less than 35 grains; (2) that at Pecos and other former settlements of the arrow-using Pueblo peoples there occur hundreds of points of comparable weight for every one of larger size; (3) that in Pueblo sites such large points as have been found hafted have usually been set in short handles for use as knives, but never in arrows; (4) that small points, which can hardly have been other than arrow-heads, appear in great quantities among the bones of slaughtered buffalo in the trap-ravines of the Great Plains, while on the other hand, the heads of all Basket Maker spear-thrower darts that have come to light are much larger and heavier than those which we can be sure were arrow-heads. I had, of course, considered the possibility that the ancient heavy points, from Folsom, Signal Butte, and elsewhere, were arrow-heads, but I was unable to see why, if they were serviceable for that purpose, they should have been replaced by the small points apparently exclusively employed by tribes of the same region in later times.

To reiterate, these facts led me to assume that small points were only suitable for arrows. But my data were from a relatively restricted area and represented a rather short period of time. Nor had I the practical knowledge of archery which enabled Mr. Browne to prove that arrows with heavy heads are not only usable but effective. In discussing the Oklahoma spear-thrower I should therefore have formulated a problem, not made a categorical statement.

However, certain identification of the nature of projectile points is an important matter. Only by such identification can we hope to determine the relative age of the bow and arrow and spear-thrower, or trace the former distribution of the two types of weapons, because both the propelling devices and the projectiles were perishable and can therefore only very rarely be recovered.

What further light can be shed on this question? For one thing, it would be desirable to know the weights of the largest stone points ever used on authentic American arrows. As I have said, my own studies have been restricted to Southwestern collections. In that area arrows were usually of reeds, very light, and

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[144] American Antiquity, Vol. 3, No. 4.

[145] American Antiquity, Vol. III, No. 1.

(though here again I speak without first-hand knowledge) presumably not adapted for heavy points. Were heavy shafts used elsewhere in North America? What is the relation between bow strength and nature of arrow? I hope shortly to be able to contribute certain data regarding the heads of spear-thrower darts and arrow-heads from the Maya area.

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THE POTAWATOMI AS ALLEGED MOUND-BUILDERS[146]

In the article: *Potawatomi*, in the HANDBOOK OF THE AMERICAN INDIANS, Bull. 30, Pt. 2, BAE., initialed by J. M. and J. N. B. H., we read on Page 291, "Sir Daniel Wilson alludes to certain graves surmounted by small mounds, which the surveyors informed him were Potawatomi burial places. Other graves of the same character found in Iowa are also known to have been burial places of people of the same tribe." What Sir Daniel Wilson[147] actually says is: "In several of the mounds of another group the surveyors noticed recent Indian graves, covered with slabs or stakes, in accordance with the usual method of Indian burial, and belonging to the Potawattomies; and Mr. Lapham adds: 'The larger and more conspicuous mounds are generally selected by the Indians for the burial of their dead.' " Lapham's Antiquities of Wisconsin[148] is referred to; I do not know the precise passage, but on Page 59 will be found, "One of the oblong elevations was entirely covered with graves recently made by them"; Menomini and Winnebago are meant. That is to say, historic Indians used prehistoric mounds as burial places.

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A NOTE ON SOUTH AMERICAN PARALLELS TO MAYA AND AZTEC TRAITS

In his stimulating *Observations on the Present Status and Problems of Middle American Archaeology*[149] Dr. J. Alden Mason indicates the South American relations suggested by Lacandon *material* culture. Possibly the affinities extend to other phases of native life.

According to Soustelle,[150] these primitive Maya retain patrilineal totemism, as discovered by Tozzer some thirty years ago, but Soustelle's totemic groups are ranged in moieties named *karsiya* and *kobo*, and among the northwestern Lacandon he even reports an approximation to exogamy (contrary to Tozzer's observations):

[146] Printed by courtesy of the Smithsonian Institution.

[147] Prehistoric Man, Vol. 1, p. 389; Cambridge and London, 1862.

[148] Smithsonian Contributions to Knowledge, Vol. 7, 1855.

[149] This series, Vol. 3, p. 306, 1938.

[150] Jacques Soustelle, Le totémisme des Lacandones, in Maya Research, Vol. 2:325–344, 1935.

"En résumé, l'endogamie, chez les Lacandons du Nord-Ouest, est plutôt rare, mais n'est pas l'objet d'une répulsion spéciale de la part des indigènes. Dans l'immense majorité des cas, et malgré les difficultés pratiques, c'est encore l'exogamie qui prévaut" (p. 336).

However, the fact most strongly emphasized by Soustelle is the assignment of all gods and natural phenomena to one or the other moiety. Thus sun, moon, and the woods are *karsiya*, while the complementary *kobo* half includes rain, lakes, and the cardinal directions. Although the recorder wonders at the classificatory ascendancy of the dual over the totemic grouping, this is exactly what might be expected, for as Olson has shown, some sort of conceptual polarity attaches to many dual organizations of the New World.[151]

In North America the Miwok present the close parallel of a thoroughgoing dichotomy of the universe, everything being either "Land" or "Water," while the Winnebago confine their cleavage to the fauna, birds being pitted against land and water animals;[152] but in South America the bisection of the universe characterizes various Gê peoples,—not only the Timbira of Maranhão, but also the Kaingang of southern Brazil.[153] Provided the polar classification with a dual organization represents a single historical origin—a debatable point, the Maya scheme may have its most direct ties with its South American counterparts.

If this connection is only a possible one, the case seems to be much stronger for an Aztec-Brazilian parallel to which I do not recall printed references. The Tupinamba of coastal Brazil raided hostile tribes mainly in order to take captives for ultimate consumption in a cannibalistic frolic; but prior to his death, the victim, apart from being sometimes vauntingly exhibited by his master, was well treated and even permitted to mate with unmarried women. In the course of the ceremonies preceding his execution, the villagers might attack him, but he was expected to defend himself, receiving stones or hard fruits with which to pelt his assailants. At the execution itself he might sometimes wield a club and struggle with his would-be slayer.[154] The kindly treatment of the prisoner during his prolonged captivity, the mock-combat, and the final cannibalistic feast present a rather convincing parallel to Aztec usage.[155]

[151] Ronald L. Olson, Clan and Moiety in Native America. Univ. Cal. Pub. Amer. Arch. and Eth., 33:401 f., 1933.

[152] E. W. Gifford, Miwok Moieties. *ibid.*, 12:139–194, 1916. Paul Radin, The Winnebago Tribe. 37 BAE-R:185, 1923.

[153] Curt Nimuendajú and R. H. Lowie, The Dual Organizations of the Ramkókamekra (Canella) of Northern Brazil. Amer. Anthrop., N. S., 39:470 f., 1937. C. Nimuendajú-Unkel, Die Sagen von der Erschaffung und Vernichtung der Welt als Grundlagen der Religion der Apapocuva-Guaraní. Zeitschrift für Ethnologie, 46:374 f., 1914.

[154] A. Métraux, La religion des Tupinamba et ses rapports avec celle des autres Tupi-Guarani. Pp. 137–169, Paris, 1928. Somewhat similar customs are reported for the Šipaya of the Rio Iriry region: Curt Nimuendajú, Bruchstücke aus Religion und Überlieferung der Šipaya Indianer. Anthropos 14–15:1024, 1919–1920.

[155] Fray Bernardino de Sahagun (F. B. Bandelier, translator), A History of Ancient Mexico. 73–78, 82–88, Nashville, Tennessee, 1932.

On the other hand, Tupinamba practices are also clearly connected with those of Carib and Arawak tribes, who similarly cooked the flesh of their captives and made flutes of their bones. The Arawak of the Berbice River hospitably entertained a victim for about three weeks, and finally crushed his skull with a sword club in the approved Tupinamba style.[156]

As for the Aztec custom of cutting open an enemy's chest and tearing out his heart, it is described by Diego de Rosales, a seventeenth century observer, as an Araucanian practice.[157]

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THE CLINICAL ASPECTS OF DIFFUSION

In this journal Harold Gladwin[158] recently offered a new version of the diffusion-independent invention problem in humourous and effective fashion. Gladwin has presented the view of the extreme diffusionist who persists in regarding the matter as a controversy rather than as a problem, and his article contains views which, while perhaps widely held, are nevertheless considered by many to be decidedly debatable. Consequently it may be profitable to present a counter argument from one of those smug individuals who persists in regarding independent invention, though perhaps a poor relation, as nevertheless an eminently respectable and self-supporting member of the community of anthropological ideas.

Gladwin's clinical account of symptoms involved in the transition from a cringing, dyed-in-the-wool Independent Inventionist to a real extroverted one-hundred-per-cent Diffusionist is very interesting to one who at moments has had very similar experiences. I remember one beautiful summer when the late Elliott Smith led me along the perfumed path of diffusion. As I recall, it was when the Children of the Sun first appeared that the glimmerings of reality began to penetrate the undergraduate delirium. It may be appropriate to describe the case of the unfortunate Independent Inventionist in medical terms. Yet, since my own taste of the deplorable state of mind of the Extreme Diffusionist, and since Gladwin speaks of the "mental weakness which will quickly and inevitably develop into that particular obsession, the victims of which are known as diffusionists," one is tempted to suggest that the remedy lies in psychiatry rather than in *materia medica*.

One may quite readily admit that many cases of "independent invention"

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[156] W. E. Roth, An Introductory Study of the Arts, Crafts, and Customs of the Guiana Indians. 38 BAE-R:591–595, 1924.

[157] Elisabeth Gerdts-Rupp, Magische Vorstellungen und Bräuche der Araukaner. Ibero-Amerikanische Studien des Ibero-Amerikanischen Instituts Hamburg, 152, Hamburg, 1937.

[158] Independent Invention versus Diffusion. This series, Vol. 3, pp. 156–160, 1937.

are instances of wishful thinking and should be thrown out the window. Still, there is no need to throw away the baby too, as the ardent Diffusionist is at times tempted to do. The child should be looked over a bit carefully to see if there are perhaps not a few points overlooked in the first hasty glance. After all, when first born, most infants are apt to appear singularly repulsive to all but their doting parents. Independent invention cannot be accepted as proven unless there is analysis of the specific situation. One might add that diffusion cannot be accepted as proven until an equally rigorous analysis has been undertaken.

The Extreme Diffusionist is only too frequently found to have overlooked some of the clinical terms involved which are still useful even if they were formulated by that bogey of many a Diffusionist, Tylor. Repeatedly in my student career, and in reading done since that time, I have encountered such phrases as "limited possibilities," "continuous and discontinuous distributions," "qualitative criteria," and relatively little, incidentally, about the "psychic unity" which seems to bring on such an acute seizure with some Diffusionists.[159] In Gladwin's presentation of the case it would appear that the wicked Independent Inventionist, especially if infected with the virus of Psychic Unity, refused to recognize the existence of diffusion. Yet Robert Lowie, in his recent and excellent book on THE HISTORY OF ETHNOLOGICAL THEORY, remarks of the period when independent invention was in its heyday "that from 1860 to 1887 there never was a time when any responsible writer denied contact as a factor in culture history."[160] Surely independent invention may ask for as much toleration from the ardent Diffusionist.

To turn to some of the specific points raised by Gladwin, he implies that to admit the diffusion of the bow and arrow is to open the flood gates of diffusion to the loom and a host of other culture traits in the Americas. Here particularly one must feel that the basic criteria have been ignored. After all, the distribution of the bow is continuous; that of the loom is not. Moreover, we have good reason to believe the two are widely separated in point of time of their original invention. In addition, in America the loom shows an extensive series of peripheral distributions of simpler types. If Gladwin wishes to include the loom with the bow, then he must include maize, beans, squash, and the whole agricultural complex as well as metals and pottery. To do that, one has no recourse but to picture the progenitors of the American Indian scurrying

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[159] Gladwin presents a curious viewpoint when he speaks of "Pygmies, Negritos and Papuans" having "about as much culture as a frog has feathers." It would seem that the ardent labors of Margaret Mead and Messrs. Fortune, Malinowski, Rivers, Schebesta, Sterling, Thurnwald, and Williams, to mention but a few, have been quite wasted. Are we to consider their bulky monographs fictional? Or can it be that the criteria of culture are to be conceived of purely in terms of stone axes, pottery, loom weaving, stone architecture, and the like?

[160] Robert H. Lowie, The History of Ethnological Theory, New York, 1937, p. 74.

across Behring Strait clutching looms to their bosoms, yet throwing their agricultural seeds and techniques and domestic animals into the sea as they crossed. Or perhaps a walrus ate them all while the purveyors of culture to the Americas anticipated Eliza on the ice. Then they raced southward, unhindered by the previous inhabitants, and arrived in Middle America with enough memory of agriculture to begin promptly domesticating an entirely new series of plants, although they had lost all memory of techniques of sowing.[161]

Again Gladwin apparently envisions a group of Negroid antecedents, starting from the West Coast of Africa, crossing Europe, northern Asia, and finally coming to rest in the midlands of America after traversing a distance nearly equal to the circumference of the globe. Even Ratzel could have done no better. Clearly here the remedy needed is a thorough dose of field ethnography to make one more appreciative of how cultures really work. That any group could wander such a distance, through territory presumably already fairly heavily inhabited by other peoples, is a heavy tax upon one's credulity; to assume that they would arrive at the end of such a trek with a recognizable racial or cultural nexus is beyond all experience.[162]

After all, as the late Erland Nordenskiöld so beautifully demonstrated, the American Indian was an inventive sort of mongrel and in some cases really did duplicate some Old World forms, as in the case of the T-shaped axe of Peru and Egypt. At least I assume this is acceptable, as we are warned against transoceanic voyages.

One might also inquire just what metal age in America "required only 600 years for its fulfillment as against 8000 years in Asia." This reads suspiciously like the sad Humpty Dumpty-like state of the Extreme Diffusionist where facts and time scales come to mean what he wants them to mean. Is Aztec Mexico or Incaic Peru a "fulfillment" on a par with our own? That is obviously what the time periods used imply. No; if a strict technological comparison is made, we can hardly go further than equate the development of American Indian metallurgy with that of proto-dynastic Sumer. Perhaps Jemdet Nasr would be even more accurate. Furthermore, for Peru, 1500 years would be a fairer time allowance for the development of metallurgy. The equation then is more accurately 1500 years for America as compared with between 2000 and

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[161] I am assuming that the botanists are reasonably correct with regard to a Middle American origin for these plants. Gladwin may not agree.

[162] One wonders with whom Gladwin associates to make him react so violently against the idea of the racial homogeneity of the American Indian. If the idea is common, one must share his shocked attitude. In my own experience, even before Hooton published "The Indians of Pecos," emphasis was always laid on the wide variability of the American Indian. Of course, the theoretical assumptions back of Hooton's interpretation of Negroid, Australoid, and other features are, I believe, questioned by some physical anthropologists. But discussion of this is outside the scope of the present article.

3000 years for Asia. In view of the tentativeness of datings in both regions, this should prove much less troubling to a sensitive soul.

Time psychoses are a common ailment of the Extreme Diffusionist. This at bottom is the difficulty which makes it possible for Gladwin to find comfort for a diffusionist view of metal working, pottery, and the loom in the world occurrence of bark buckets, grooveless axes, and cord-marked pottery. Even if one grant the diffusion of these latter items, it is hard to see what bearing they have on the problem of metal working which we know in both a technological and chronological sense is a later development. Furthermore, even a very feverish Independent Inventionist will usually admit the diffusion of stone grinding techniques. This granted, however, it should be borne in mind that a grooveless axe is really the simplest type to make. Let us, though, not argue against its diffusion. Rather, may we not ask why the medical prescription offered us of a grooveless axe, or even a three-quarter groove axe, to which is added two bark buckets and a few incised pots in the Eastern Woodland should, when taken, produce a rash of a loom, a bronze axe, and half a dozen agricultural plants in Middle America? Even without invoking the hideous term of "psychic unity," some things, such as the proper percentage of tin to produce bronze, might result from independent experimentation.

In this connection one must call attention to the fallacy which Gladwin shares with others as to the character of our knowledge of Middle American archaeology. J. Alden Mason recently stated: "Of the archaeology of a great part of Mexico and Central America we still know practically nothing."[163] With this statement I heartily concur. To compare the exploration of Mexico with that of the Southwest is simply ludicrous; yet even in the Southwest there have been revolutionary discoveries in recent years, in most of which Gladwin himself has had an important part. Moreover, the search for obscure early sites in much of the area is enormously difficult where jungle or tropical-rain forests are found. From personal experience in the two areas I am convinced that the search for sites without surface architectural remains in the Southwest is about 1000 per cent easier than in all but the arid portions of Mexico.

A. V. Kidder has remarked that not until all possibilities north of Central Chile have been exhausted will he begin looking overseas for the origins of advanced culture in the Americas.[164] If Mason's view is correct, Kidder has as yet little to fear. And unless the Extreme Diffusionist resorts again to long ocean voyages and the transplanting of Middle American cultures as a *series* of going concerns from some at present unimaginable sources, the archaeological data so far would leave at least as many unsolved problems for him as for the Independent Inventionist. If we cannot adequately trace development and

[163] J. Alden Mason, Observations on the Present Status and Problems of Middle American Archaeology, Part I. AMERICAN ANTIQUITY, Vol. 3, p. 206, 1938.

[164] A. V. Kidder, Speculations on New World Prehistory. Essays in Anthropology in Honor of A. L. Kroeber, Berkeley, 1936.

diffusion from a Middle American center of origin, even less can we trace diffusion *to* Middle America.

On close examination, Gladwin seems to view with alarm a number of things which are primarily either straw men of his own creation or situations in which the facts and scientific criteria of judgment have not been fully apprehended. No doubt he had a very good time writing his article, as I have had in penning this reply. But taking an extreme position necessarily leads to sniping from the other side. As Lowie remarks, "Such diversity of opinion should be seen in proper perspective. Some of it is inevitable and desirable in a live and growing branch of knowledge; some of it is illusory—the figment of controversial would-be Messiahs who obscure issues by a melodramatic contrast between the elect and the doomed."[165] Rather than being partisans of either extreme diffusion or independent invention, we cannot do better than try to merit the praise given Tylor: "What distinguishes Tylor from the extreme diffusionists is simply his serene willingness to weigh evidence."[166]

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[165] Lowie, *op. cit.*, p. 253.
[166] *Ibid.*, p. 75.

NOTES AND NEWS

Pacific Coast Area

The reconnaissance work of the Southwest Museum and the Carnegie Institution of Washington in northern California, mentioned in the July issue of this series, was productive of very interesting results. In fact, a site was found yielding Folsom artifacts on the surface of a deep deposit containing non-Folsom points and implements. This site was situated on the former shore-line of the partially dry Borax Lake in Clear Lake Park, Lake County.

The first work was done in April by Messrs. M. R. Harrington and S. M. Wheeler, accompanied by Mr. C. C. Post, who first reported the site, and Mrs. Post. In June they returned to the site and spent six weeks excavating with a larger party.

In general it may be said that Folsom points, in fact most of the Folsom Complex of Roberts, are found only on the surface of the site; along with the Silver Lake and Lake Mohave types illustrated by the Campbells, a local type recently named the "Borax Lake," and certain willow-leaf and keeled points.

Below the surface all the types named, except the Folsom and the Lake Mohave, may be found at various depths, becoming scarcer in the lower levels. The deepest artifact found, a worked piece of obsidian, was unearthed at a depth of ten feet five inches. Rough slabs of stone with small grinding surfaces on one or both sides—primitive metates—were found in place at considerable depths, and are therefore early.

Geologically, the site appears to be a fossil alluvial fan laid down during the pluvial period following the glacial retreat. During the building of the fan, and even before it started, the place was a camping ground for ancient peoples who probably visited the region to obtain obsidian from the near-by quarries. Among the latest of these peoples to occupy the site was "Folsom Man." (*E.W.G*)

During the past year the Los Angeles Museum has been busily engaged in cataloging the results of previous excavations in California and Arizona. In addition, one student has been making a survey of the mortars and pestles in collections with an eye to making a distribution chart of types of these objects throughout California. He has also been correlating published data on these specimens with the collections. So far no attempt has been made to get a generalized or specific range of certain mortar types, and with the metate-mortar discussion in the forefront as the result of all of the discoveries of ancient man in California, it seemed worth while to conduct such a survey.

The Museum has likewise acquired a fairly nice collection of Peruvian archaeological material including 135 pieces of textile, approximately 100 pieces of pottery of various types, and some silver, bronze, shell and wooden specimens. These were brought out of Peru a number of years ago and form a welcome addition to the South American collections. (*E.W.G.*)

Through a grant of funds from the Carnegie Institution of Washington, the San Diego Museum has been enabled to undertake an archaeological project, beginning July 20, in western San Diego County. During a period of six weeks, exploratory trenches will be opened through a section of an old aggraded channel of the San Dieguito River under the supervision of Malcolm J. Rogers of the latter institution. The section to be explored offers valuable stratigraphic evidence of the cultural sequence of the region as well as some indication of relative age, in that workshops of an early hunting people lie fourteen feet beneath a Yuman camp-level. (*Malcolm J. Rogers*)

On May 7, Prof. Charles Hill-Tout participated in the dedication of the cairn erected to mark the site of the Great Frazer Midden at Marpole Park, Vancouver, British Columbia. In his speech, he told of his investigations at the site forty-five years ago, and reviewed the information obtained therefrom relating to the ancient inhabitants of the region and their cultural peculiarities.

Southwestern Area

The Clearing House for Southwestern Museums was organized in June of this year. At the organization meeting, central headquarters were assigned to the Denver Art Museum. The Clearing House is to have an annual meeting at the time and place of the yearly meetings of the Southwest Division of the AAAS. There are no officers other than the Secretary, and neither constitution nor by-laws.

Clearing House members are to consist of all interested public and private museums of anthropology in Colorado, Arizona, New Mexico, West Texas, and Southern California.

It is proposed that the Clearing House may be of service to its members by assembling at the central office information concerning collections, library facilities, slides, photographs, moving picture films, and lists of active and planned projects. These data are to be analyzed in order to obtain a perspective of the status of anthropology in the Southwest. On the basis of these findings, it is hoped that studies may be facilitated by means of inter-museum exchanges and loans.

By means of a monthly news-letter the Clearing House plans to bring to its members information on the latest publications, suggestions for field and laboratory techniques, reports on projects, analyses of data, and a ready means of communication. The first of these news-letters has been issued. (*Eric Douglas*)

Northern Mississippi Area

Dr. Albert Ernest Jenks, Head of the Department of Anthropology, University of Minnesota, has terminated his long and productive period of active service in that office, having reached the age of compulsory retirement.

Mr. H. Holmes Ellis has submitted the following report on research by the Lithic Laboratory, Ohio State Museum.

"The field work carried on by the Lithic Laboratory this summer has consisted in the main of the collecting of comparative materials from all outcrops and quarries in Ohio, forty different sites, and from several sites in the surrounding states. Specimens of flint and other lithic substances used by the Indians have been gathered in Crawford and Harrison counties, Indiana; Breathitt, Carter, and Meade counties, Kentucky; Huron County, Michigan; Campbell County, Tennessee; Fauquiere County, Virginia; and Kanawha County, West Virginia. The Ohio collections include specimens from Athens, Coshocton, Franklin, Gallia, Highland, Hocking, Jackson, Lawrence, Licking, Perry, Scioto, Stark, and Vinton counties.

"For comparative materials from other localities we are depending on the generosity of our collaborators and friends in the more immediate vicinity of the particular sites, since our present funds will not allow a personal examination of all the quarries and outcrops in the Eastern United States.

"During the remainder of the season we will confine our efforts to the critical examination of flint mechanics and techniques and spend some time on special problems, such as the distribution of certain varieties of flint; pipestone in Ohio, Wisconsin, and Minnesota; the accumulation of information on flint disks of the Hopewellian type; and the cataloguing of data concerning cache finds of stone implements and finds of quarries and workshops used by the aborigines." (*T.D.*)

The State Historical Society of Iowa is sponsoring, this year, excavations of house sites and mounds near Glenwood in southwestern Iowa, and of two mounds and a small village site at Webster City, in the upper Des Moines River valley. At Glenwood, Mr. Ellison Orr, of Waukon, took charge of a W.P.A. crew of ten men in early April, and to date (August 15) has excavated ten house sites and two mounds. For the houses and one mound the Nebraska culture is indicated; and for the second mound, the Woodland. Work will continue until cold weather sets in.

At Webster City, Miss Mildred Mott, of Iowa City, with student help from Cornell College and the financial support of Mr. MacKinlay Kantor, author, did two months' work during June and July. The mounds showed evidence of Woodland authorship, and the village site yielded a valuable collection of potsherds and other artifacts, all apparently Woodland but with features that may place them in a new aspect or phase; there were pots with rounded bottoms and a sharp break from rim to shoulder, lips projecting outward, outer rims with elaborate designs in trailed lines. (*T.D.*)

The University of Chicago carried on its fifth season of work at the Kincaid site, near Brookport, Illinois, from June 17th to August 27th. Twenty-six graduate students from six universities composed the party which entered the field under the direction of Dr. Horace Miner. This group was halved in midseason, after the period of more intensive instruction. In early July, a three-day

field conference, led by Dr. Fay-Cooper Cole, was attended by many of the leading archaeologists of the Mid-West. Conferees were familiarized with the site, its excavation, and its problems. Dr. Florence Hawley Senter discussed the progress of dendrochronological work in the Mississippi drainage, and Miss Madeleine Kneberg described some of the work of the new laboratory at Knoxville.

Three sections of the site were excavated during the season: the 1936 trench into the largest pyramid was carried farther into that mound; new work was begun on top of a long, flat-topped mound; and the excavation of the burial mound was continued for the third season. The trench into the largest mound was carried down twenty feet and showed conclusively that the pyramid had been erected in a series of stages, the completed mound being made up of the accumulation of these four to six foot layers. No evidence of structures or habitation was found on top of any of these levels.

The excavation of a long flat-topped mound with a truncated cone on one end revealed an earlier flat-topped conical mound under the present one. Around the top edge of this primary mound runs a ridge of earth two feet high. Within the confines of this ridge, the corner of a floor was encountered at the end of the season. At the level of the mound upon which the truncated cone rests, a large burned structure was uncovered. It had wattle and daub walls; a central pillar composed of two upright posts, two feet apart, both encased in smoothed mud and grass daub; an adjacent fire pit; a clay bench along one wall; and a hard packed floor.

The burial mound is possibly the most significant part of the site excavated, for here there is definite stratigraphy of cultural materials represented in pure sites throughout the region. In the river silts under the mound, there are found occasional sherds of pottery like those of the Woodland Baumer site. Above these clays is a Woodland village level of a different culture—the Lewis Component. Over this village, a Middle Mississippi burial mound was built up by the accretion of successive burials. Into this mound were set stone cists. There are, therefore, two types of burials: extended on the back between layers of bark and covered with earth, and extended on the back in stone cists. The heads are to the west in both types, and grave goods are rarely found. A single cist contained four bundle burials. There is definite evidence that the cist complex came in later but coexisted with the simpler bark burials.

In addition to the work at Kincaid, the University cooperated with Mr. Irvin Peithman of Southern Illinois Normal University in the excavation of a rock shelter near Carbondale, Illinois. Work at Kincaid next season will concentrate on the pure sites of the Baumer and Lewis components, and conclude the excavation of the structure on top of the truncated conical mound. (*T.D.*)

Northeastern Area

The following note is from Douglas S. Byers and Fred Johnson of the De partment of American Archaeology of Phillips Academy, Andover.

"The Department is at present engaged in excavating a shell heap on the Richard's estate in Blue Hill, Maine. Surface indications promised that we would discover Indian remains of the Colonial Period. At the present time nothing has appeared which is certainly as late as this. The artifacts which have come to light, however, seem to belong to a late period in the occupation of the region. The pottery shows characteristics in design which are reminiscent of Woodland slightly influenced by Mississippi. Shell temper is very rare indeed, the usual type being sand, a condition which might be considered unusual in this region. The stone artifacts exhibit many differences in type, which in time may prove to be of considerable significance. The use of jasper and chert is unusual in this district. To date the bone specimens exhibit no peculiarities which segregate them from the usual material from the Maine littoral. The heap itself is producing a great deal of information concerning the process by which a shell heap is built up. The most interesting features are complicated stratified hearths, some of which begin as the bottom of the shell deposit and extend upwards nearly to the surface." (*W.A.R.*)

The Rochester Museum of Arts and Sciences, directed by Arthur C. Parker, is devoting its second season to the excavation of two large village sites of the newly defined Laurentian Aspect, at Brewerton, on Oneida Lake, central New York. A party of five, in active charge of William A. Ritchie, has again demonstrated the association in deep refuse deposits of native copper objects; gouges; bannerstones of several forms; plummets; a wide variety of points, knives, scrapers and drills of sundry materials; choppers; scanty rocker-stamped and fabric imprinted pottery; and several other significant stone and bone types. While it is amply evident that the Laurentian complex represents an old horizon widely spread over the northeast, and previously known only from surface remains, its chronological relationship to the Lamoka Focus, Archaic Pattern, cannot yet be stated. There is slight evidence to indicate a partial overlapping of the two cultures.

On a knoll in the vicinity of one of the Brewerton stations, a site of the later Point Peninsula Focus was discovered. The numerous graves contained bundle burials exclusively, single and multiple, cremated *in situ*, with such grave goods as thin leaf-shaped cache blades, as many as 90 with a burial; distinctive points, knives, scrapers, and drills, mostly based on cache blades; gorgets; bird-stones of two types; pyrites and flint strike-a-lights; celts; adzes; a tubular pottery pipe; steatite and clay potsherds; bone awls; and a dagger blade. Many of the objects had been placed in recesses in the grave walls, and these were less severely damaged by the fire. Deer and dog bones, also calcined by heat, occurred among the human remains. This site provides confirmation of the known Pt. Peninsula congeries and contributes a number of new burial traits to the culture. (*W.A.R.*)

The New Jersey State Museum has continued to sponsor the W.P.A. Indian

Site Survey under the supervision of Dr. Dorothy Cross. Over a period of two years, 27 sites throughout the State have been examined, and at the present time excavations are in progress in Burlington, Mercer, Monmouth, and Sussex counties. The Abbott Farm, on the Delaware River bluff south of Trenton, continues to be the most productive and most significant.

During the past six months, excavation at this site has been confined to the edge of the 75-foot bluff. This area appears to contain the remains of a slightly different culture from that found farther inland, where most of the previous work had been concentrated. This is interesting because the excavations are only a few yards apart. The stone industry here exhibits poorer workmanship, due perhaps to sophistication, as only that part of the implement designated for use, is finished. This portion, however, is shaped adequately and, in some cases, to perfection. Pottery is found in abundance and differs considerably from that encountered in other parts of the site. Most of it is finely decorated with bold, clear-cut incisions. The composition of design is more complex and shows that great attention was paid to detail. The "fill ins" are executed with extreme care and are patterned to achieve a plaid effect instead of the normal rough cross-hatching. Among the new shapes, two related types may be singled out: (1) a deep bowl with a wide collar and rounded base sharply inset from the collar; and (2) an ovoid jar with a rounded base, again sharply inset from the shoulder.

The collar of the bowl is always decorated with a finely executed herringbone design. The ornamentation of the jar is confined to the shoulder above the inset and is arranged in panels. The design consists of parallelograms and triangles. The former are filled with plain, horizontal, parallel lines alternating with zig-zag lines, cross-hatching, or additional paralleled lines. The triangles are either filled with cross-hatching leaving the surrounding surface plain, or the procedure is reversed, leaving the triangle undecorated. An interesting analogy to the so-called "sophisticated" stone work is found in the Salisbury Excavation, along the Delaware River south of Bridgeport, Gloucester County. This site definitely belongs to the contact period, having produced numerous trade objects including clay pipes datable to the middle of the 18th century.

Here again, only that part of the implement which was to be used was finished. Most of these are flakes retouched to serve as knives, scrapers, and drills. These implements are also peculiar because of the fact that they are made from long slender flakes exhibiting a chipping technique exceedingly rare in New Jersey. The explanation as to why the long flake should be so abundant in a concentrated spot awaits further study.

This same excavation has produced material which throws considerable light on the little-known textile industry of the aborigines. A number of flat-based, coarse, steatite-tempered vessels containing impressions of woven mats have been found. These impressions are distinct and three main types of weaving, including the twilled, wrapped, and twined, are discernible. (*W.A.R.*)

Southeastern Area

Dr. Williard Z. Park, formerly with the Department of Sociology and Anthropology at Northwestern University, has been appointed Professor of Anthropology and Sociology at the University of Oklahoma. These two fields, previously handled as separate departments, are now combined with Dr. Park as official head. Dr. Forrest Clements will continue his work in anthropology in the new department, and on the research side will devote much of his time as usual to the archaeology of Oklahoma.

Obituary

Mr. George Arbor West, President of the Board of Trustees, Milwaukee Public Museum, succumbed to pneumonia on January 20, 1938, at the age of seventy-nine. His loss will be keenly felt by fellow students and friends throughout the country.

Mr. West early in life evinced an enthusiastic interest in various branches of science, and, despite an exceptionally active and successful business and professional career, he was never too busy to devote time and effort to the support of scientific and educational projects. This interest grew with the passing of the years, occupying a constantly increasing share of his thoughts up to the very day of his death. A cursory examination of his activities toward the advancement of knowledge will yield some slight conception of the important share of his life spent in this, to him, wholly enjoyable service.

He was an active member of long standing in the Wisconsin Natural History Society, selecting as his particular fields of interest the subjects of archaeology and geology. He was also active in the Wisconsin Historical Society, the Wisconsin Academy of Sciences, Arts and Letters, and the Midwest Museums Conference. He participated in the founding of the Central Section of the American Anthropological Association. From its first inception, he was an enthusiastic supporter of the Society for American Archaeology. It was largely due to his active interest that the Wisconsin Archeological Society was organized, in his home, and he has always been considered as the father of that pioneer organization in the field of Midwestern archaeology.

Perhaps Mr. West's most noteworthy service was rendered through his membership on the Board of Trustees of the Milwaukee Public Museum. Appointed to the board in 1907, he soon became its president and contributed his wisdom and support to the Museum as its official head for thirty years. One of the best known exhibits in this institution is the Geo. A. West Collection of North American Aboriginal Pipes.

The best known of Mr. West's many publications is his monograph on Tobacco, Pipes and Smoking Customs of the American Indians. In addition to his knowledge of pipes, he was widely known as a student of aboriginal copper mining and copper artifacts, and he was preparing for publication at the time

of his death a monograph on North American chipped-stone techniques and products.

Mr. West's broad interests and fine spirit of coöperation brought within the the circle of his associates and personal friends collectors and students from coast to coast. His death will be widely felt and lamented.

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The Significance of Folsom and Yuma Artifact Occurrences in the Light of Typology and Distribution. J. L. COTTER. (in 25th Anniversary Studies, Philadelphia Anthropological Society, Vol. 1, pp. 22–35, 2 text figures, Philadelphia, 1937.)

The discovery of the original Folsom and subsequent sites and the identification and development of the so-called Yuma phase of the problem are reviewed in this article. The association of Folsom and Folsom-like points with extinct species of animals is discussed, and the general distribution of the artifacts is summarized. Certain outstanding features are noted, and from them the author draws a number of inferences and indicates possible interpretations relative to their significance. He stresses the close typological affinities between the Folsom and Folsom-like points; suggests that the distribution shows either a widespread sub-stratum of the Folsom complex or a scattering of the technique through diffusion, or an actual trade in the objects themselves; and emphasizes the need for finding these points in a geologic association in regions outside of the High Plains.

Less attention is given to the Yuma type points, although the author gives a good description of their main characteristics and indicates some of the difficulties arising from the multiplicity of sub-types covered by the name. In this connection he properly calls attention to the fact that use of the Yuma outline form alone as a criterion for identification cannot be relied on because many common artifacts from recent sites exhibit similar outlines but do not have the chipping characteristic of the true Yuma. Unfortunately the Yuma question has been confused and complicated by failure to observe that feature, and misleading information on the distribution of the type has been put into circulation as a result. Cotter is to be commended for his emphasis on this factor, and also for calling attention to the fact that the generally accepted sequence of Yuma forms is theoretical, being derived from an interpretive study of typological evolution, and not based on actual evidence.

The present article would have been more satisfactory if the discussion of the occurrences of the Yuma type was in greater detail and not confined to those "where it supplements Folsom data in definite deposits." The reader is left somewhat in a quandary as to whether or not it is as widespread as the Folsom and is present in all sections where the latter is found. From the statement " . . . Yuma artifacts are only one type among many definitely associated with Folsom industry." (p. 30), the implication is that they go hand in hand. Actually this still has to be determined. They do occur together in some sites but not always in unquestionable association, and elsewhere they are found separately. Some light might be thrown on the significance of this situation if there was information on the Yuma distribution comparable to that on the Folsom. Cotter's knowledge of the Yuma would permit him to plot that dis-

tribution better than any other investigator. The Yuma may eventually prove to be just another Folsom implement. From present evidence such a conclusion is not wholly warranted. The issue has not been helped by a general impression that a Folsom point is merely a Yuma with channel flakes removed to produce the characteristic fluted faces. In some cases that is true. In many others the flaking on the Folsom is definitely not of the Yuman type. As a matter of fact many examples of fluted points with Yuman flaking give the impression that the channels were produced by persons not entirely familiar with the process, and suggest a borrowed trait.

Cotter's conclusion that there is a close typological relationship between Folsom and Folsom-like points was borne out by the action of one of the committees at the Symposium on Early Man held in Philadelphia in March, 1937. The members agreed that all fluted points should be designated Folsom, and that the terms Folsom-like and Folsomoid be abandoned. This decision was reached prior to the publication of the book containing Cotter's article, but the latter was no doubt in type before the meeting, and the author not able to adopt the new terminology.

FRANK H. H. ROBERTS, JR.

Archaeology of St. Lawrence Island. HENRY B. COLLINS, JR. (Smithsonian Miscellaneous Collections, Vol. 96, No. 1, pp. 424, map, 26 text figures, 84 plates, Washington, 1937.)

The author here presents in full detail the results of his 1930 and 1931 excavations at Gambell, on the northwest corner of St. Lawrence Island in the Bering Sea, which he has already summarized for us in three or four short papers.

A brief introduction outlining the various theories that have been advanced concerning the origin of Eskimo culture (or cultures) leads to a summary of the history of St. Lawrence Island since its discovery by the Russians in the early 18th century. Then comes the description of the five sites at Gambell and of the objects unearthed in each, beginning with the oldest or Hillside Site that yielded the long-sought "Old Bering Sea" remains. This portion of the book covers some 250 pages. In the succeeding 100, the author compares the house-types, art, and implement forms on St. Lawrence Island with those found in other parts of the Eskimo and adjacent areas; and in a 20-page conclusion he reformulates the probable migrations of the Eskimo throughout the Arctic and sets forth the problems that still await solution.

The non-specialist in Arctic archaeology will be most interested in his conclusions. He distinguishes on St. Lawrence Island the following succession of cultures: Old Bering Sea, Punuk, and Modern. In the Old Bering Sea period a remarkable curvilinear art reached its peak and began to decline, whaling and dog-traction were unknown, and many implements, particularly harpoon-heads, had slightly different forms from those in later times. Whaling appeared

in the Punuk, when the free-flowing curvilinear designs broke down and art became more mechanical. The house forms, too, underwent a slight change, many new implements (bird bolas, wrist guards, slat armour, and so on) appeared, and minute quantities of iron were introduced from some unknown pre-Russian source. The Modern period (i.e. the last 200 years) saw further changes in harpoon forms, and the introduction of dog-traction, pipes, snow-shoes, bird figures, and other objects.

The origin of the mature Old Bering Sea culture remains unsolved. The author finds no direct antecedent for its remarkable art, although the elevated eye designs suggest to him some historical connection with the eye motives of the Chinese Shang dynasty. Several details in the composition of Old Bering Sea art that recall Melanesian designs he inclines to regard as mere convergence.

For the sudden appearance of wrist guards, bow bracers, sinew twisters, a new type of arrowhead, and slat armour during the Punuk period he postulates either a gradual diffusion of these elements from China or Korea, or else the intrusion of a hostile group into northeastern Siberia. He declines to commit himself on the relationship between Eskimo slat armour and that of the North Pacific Coast.

The Old Bering Sea culture, he concludes, gave rise to the Punuk culture on St. Lawrence Island, and to the Birnirk culture at Barrow and other places to the northward; but whereas the Punuk led directly to the modern Bering Sea culture, the Birnirk gave rise farther north to the Thule, which was carried eastward to Hudson Bay and Greenland during the first millenium A.D. Much later, there was a return wave of the eastern Thule people into north Alaska, introducing stone lamps, small ivory bird figures, objects connected with dog traction, and drilled lashing and rivet holes on harpoon heads, traits that did not reach St. Lawrence Island till perhaps the beginning of the 19th century. This return flow of Thule people westward may explain, Collins thinks, the peculiar form of the Barrow house, the similarity of Eskimo dialects from Greenland to Bering Strait, and the Eskimo-like tales in the mythology of the Chukchee.

Still another attractive hypothesis he advances. While rejecting, like most writers, any migration from Asia to America by way of Kamschatka and the Aleutian Islands, he believes that there was a migration in the reverse direction that carried into Kamschatka such typical south Alaskan traits as the stone lamp, labrets, a peculiar type of underground house and several others. He suggests that a migration in this direction would not be impossible for the seafaring Aleutians, and that it might explain the much-discussed resemblances, particularly in mythology, between the northwest Indians and the Palae-Asiatic tribes of Siberia.

Finally, embracing whole-heartedly Hatt's theory of an early coast culture that spread throughout northern Asia and America, and was later overlain to a large extent by an inland culture, he suggests that we add to the elements of the inland culture blunt bird arrows and wrist guards, possibly also the sinew-

backed bow, the bird bola, and the crooked knife. To the coast culture, on the other hand, he would assign most of the elements found in the Old Bering Sea remains on St. Lawrence Island.

There can be no question that this is a most stimulating chain of theories, opening up new vistas, but leaving certain problems still unsolved. One wonders to begin with, whether the author has not leaned too heavily on purely local developments to explain the change from the Old Bering Sea to the Punuk culture, and the extraordinary variety of forms, especially of harpoon-heads in the Punuk. It is certainly strange that all, or nearly all the Birnirk type harpoon-heads should be of bone instead of the usual ivory, and that they are undecorated. Moreover, the drab Thule Type C harpoon-heads seem rather out of place in strata that bear the more shapely and ornamental Punuk forms. If the Birnirk culture near Barrow be regarded as a direct outgrowth of the Old Bering Sea, as the author suggests, it is hard to understand why the art of the latter culture vanished so quickly in the north, but underwent a steady evolution (or devolution) around the Bering Sea. These difficulties disappear if we regard the Old Bering Sea culture as a rather local, peculiarly artistic phase of a more generalized pattern centered perhaps farther north on the Siberian coast, and postulate that it was from this more general pattern that the Birnirk and, in later times, the Thule evolved. The Birnirk and Thule Type C harpoon-heads on St. Lawrence Island would then appear not as local developments, but as elements imported from the north, with which the island had direct or indirect contact even in Old Bering Sea times, as indicated by the whetstone of Kobuk River nephrite found by Geist at Kukulik, not many miles east of Gambell (Geist and Rainey, "Archaeological Excavations at Kukulik," Washington, 1936, p. 190). However, we must leave the decision on this question to future excavations.

The arguments in favor of a migration, however small its dimensions, from the Aleutian Islands to Kamschatka appear fairly convincing; one looks forward to seeing them confirmed by excavations on the Asiatic side. More doubtful is the theory of a return migration of the Thule people westward into Alaska. Dog traction may be older in Alaska than appears from the Gambell remains, for, as Mathiassen has already observed, its absence would make the Thule migration eastward to Greenland well-nigh incomprehensible. We know that there was an old trade route from Siberia via the Kobuk and Colville rivers to the Arctic coast east of Barrow, thence to the Mackenzie River delta and farther east; and it would be natural for a few traits (e.g. stone lamps) to filter westward. The archaic character of the Barrow dialect, which has not undergone many of the sound changes of the eastern ones, is difficult to explain by any westward migration. Nevertheless, a withdrawal into north Alaska of Thule peoples from Bank's Island and the area immediately east of the Mackenzie is by no means improbable, even if the evidence the author adduces seems not quite convincing.

The use of the term "cultures" for the coastal and inland complexes outlined in Hatt's fertile theory appears rather misleading. Neither complex presumably was a single culture in the usual sense of that term, but rather a number of cultures that had certain features in common. The emergence of the inland complex, and its interaction with the coastal, involving, one would imagine, modifications in the cultures of both, must have long antedated the Christian era, at least in Siberia. Consequently, it is difficult to see what criteria we can use to separate the two complexes in much later remains like those of the Old Bering Sea.

Rather hesitatingly, the author subscribes to Mathiassen's opinion, that the Dorset culture of the eastern Arctic was originally an Indian culture that worked northward before the spread of the Thule culture to the central regions; later, with the advent of the Thule Eskimos, the Dorset people gave way and gradually succumbed. The chief objection to this theory seems to be that many of the non-Indian traits in the Dorset culture are equally non-Thule, but seem to hark back to a much earlier Eskimo stage. One recalls in this connection that Greenland Eskimo skulls, outside of Smith Sound, resemble those of Birnirk much more than they do Thule skulls from the eastern Arctic, or the skulls of Thule descendants in Smith Sound, Southampton Island, and Barrow. Is it conceivable that the Greenlanders derived their skull form from the Dorset people, and that the latter were in some way related to the Birnirk?

One or two minor topics merit attention. The Gambell ruins yielded a number of ivory-winged figures that were probably ceremonial objects, though their real use is unknown. A small winged figure, set on the end of a decorated ivory stem, was dug up at Birnirk in 1913. The reviewer showed it to an old Barrow native, who explained that these objects were planted on top of the snow huts during the caribou-hunting period to give the hunters good luck. Such a use seems more plausible at Barrow, however, than on St. Lawrence Island.

Near Gambell were two rows of jumping stones similar to the rows of jumping stones in Greenland. It is interesting to notice that Wintemberg discovered what appear to be jumping stones on the northwest coast of Newfoundland close to remains of the Dorset Eskimo culture.

A final word about the author's field methods; they fully maintained, as we would expect, the high standards we associate with the Smithsonian Institution. despite the difficulties presented by the frozen soil. His report, too, is a model of clear writing, nicely combining meticulous detail with broad interpretations that evince deep scholarship. One can say without hesitation that if Mathiassen's *Archaeology of the Central Eskimos* set up the first milestone along the path of Eskimo pre-history, Collins' report has surely set up the second.

DIAMOND JENNESS

Bulletin of the Texas Archeological and Paleontological Society. (Vol. 9, 244 pp., 43 plates, Abilene, Texas, September, 1937; $3.00.)

This is the ninth annual publication of the Texas Society, and contains two book reviews, four editorials, a Secretary-Treasurer's report, a list of members, and ten articles.

Archaeological Investigations on the Bayou Macon in Arkansas, by Harry J. Lemley and S. D. Dickinson (pp. 11–47), is an account of nine excavations by the authors. The types of sherds found are then assigned to the established Deasonville, Marksville, and Coles Creek complexes.

The article is amply illustrated by six plates, well documented, and gives a clear idea of the authors' finds. The correlation with the sequence of the Lower Mississippi Valley makes the article of great use to those working there and in other contiguous areas. It is hoped that future investigations will supply fuller information concerning traits other than pottery, particularly house types.

Excavation of Murrah Cave, by W. C. Holden (pp. 48–73), describes the excavation of and the material obtained from a site near the mouth of the Pecos River.

The excavation was made in three levels, the first two being completed, and the third (bottom) consisting of trenches along each side of the cave. Presumably these levels covered the entire area excavated and were taken from a datum point probably at the peak of the cave deposit. If this was the case, it seems likely, judging from the longitudinal section shown in Plate 7, that the midden deposits may have been cross-cut, so that each level removed may have actually contained somewhat similar amounts of material deposited throughout the occupancy of the site. The comparatively shallow depth of the deposit and the limited area occupied, however, would seem to exclude the possibility of any great length of time being represented. Others will probably agree with Dr. Holden that no cultural changes are manifest in the material, unless it be the types of projectile points shown in Plate 8A, figs. 13 to 16. Other investigators in West Texas caves have found that these arrow-head types are actually later, at least in some instances, than the types represented by figs. 1 to 12, Plate 8A.

The possibility of a similar relationship at this site is suggested by the fact that the arrow points represent only two per cent of the total projectile points found, that the projectile types were distributed horizontally rather than irregularly at all depths throughout the site, and that at least one interruption in the occupancy of the site is indicated by "a four-inch layer of wind-blown dust distinctly stratified . . . " in a small area eighteen inches from the surface.

Folsom and Yuma Points as Known Today, by E. B. Renaud, (pp. 74–88), presents a full description of the characteristics of these two well known points, giving an ample bibliography. The range of the types is illustrated by outline drawings. An additional plate might well have been shown indicating the nature of the flaking of the Yuma point. Although the paper is primarily concerned with the description of the classic projectile types, a fuller account of the associated artifacts would have been welcome.

In *A Study of Indian Pictures in Texas*, by Forrest Kirkland (pp. 89–119), the author and his wife, both professional artists, have undertaken a worthwhile task in reproducing the Texas pictographs, and the Texas Society is to be commended in encouraging this work by arranging for an additional paper each year for its annual bulletin. It is here suggested that eventually some arrangement may be made whereby the pictographs may be reproduced in color.

The methods and materials used by the Kirklands are fully described, and the results are highly satisfactory, even as reproduced in half-tone. The author's plea that the chalking or oiling of pictographs by scientists be replaced by an application of clean water, since that is more effective, will surely meet with general approval.

Exception may be taken to the author's designation of certain Texas types as "Basket Maker," since this term usually connotes a culture as yet not defined in Texas. Typological differences in Texas pictographs are obvious, however, and it seems likely that some sort of correlation between them and other material traits will be possible.

Further Remarks on the Pre-Columbian Relationships between the United States and Mexico, by J. Alden Mason (pp. 120–129), is particularly stimulating because of Dr. Mason's wide experience. While his thesis is built around the general belief that " . . . most of the higher elements of North American aboriginal culture originated in Mexico and spread from there to the less highly civilized peripheral regions," he calls attention to the fact that " . . . of recent years we have become a little less certain of influences from Mexico."

The presence or absence of the following traits in Mexico, the Southwest, and the Mississippi Valley, and their probable route of diffusion by way of the Plains, Texas Coast, Florida, and the Antilles is discussed: monolithic axes, flint swords, seated human figures, sculptured idol heads, truncated pyramids, spool-shaped ear-plugs, tripod vessels, plumed serpent, art of engraved gorgets.

While the temporal element, which Dr. Mason points out as needing careful consideration, is not yet known, recent finds in the Southwest (information not yet published) indicate that the relations between the Southwest and Mexico may be much closer than Dr. Mason shows. These finds consist of the spool-shaped ear-plug, the seated human figure of clay and stone, and the tripod vessel. Also, in addition to the ball courts mentioned by Dr. Mason, there are: copper bells, clay figurines, a knowledge of the art of stone carving certainly capable of producing both monolithic implements and sculptured idol heads, intricate stone chipping, and the art of engraving on shell comparable to that of gorgets. Specific analogies of these last three elements are lacking.

The close analogies in the pottery found in Arkansas with that of the Q-complex of Central America is the principal basis on which Dr. Mason concludes that influences from the lowlands of Mexico reached the Mississippi Valley at a comparatively early date. Again, recent finds in the Southwest have shown that similar analogies may be made with other early phases in the Southwest in the treatment of red and brown wares by polishing and incising.

Dr. Mason concludes that, in addition to the early influences from lowland Mexico to Arkansas, a similarly early influence from highland central Mexico is manifest upon the Southwest, principally by way of the metate-maize-pottery complex, and late ephemeral trade relations and consequent influence from the same region upon both the Southwest and the mound area.

Investigations now being carried on in the Southwest show that the metate at least has its prototype in a long series which extends into a geological period of considerable antiquity.

Dr. Mason has pointed out that " . . . the ball-courts, of which several have been found in Arizona, need not be *ipso facto* of more southern origin; they might belong to an old common cultural background, or it is not impossible that the influence ran in the opposite direction." When to the ball-court are added the other elements common to both the Southwest and Mexico, the inference that the influence was from north to south is even stronger.

Excavation of Pueblo Grande de Nevada, by M. R. Harrington (pp. 130–145), deals with a region about which little is known and even less has been reported. While the article is of a general nature, it gives a well rounded picture of the site excavated, the material found, and a correlation with the culture of contiguous regions which it most closely resembles. A fuller more technical paper would be welcome, since the material described differs in many respects from that from similar cultural horizons in the Southwest.

Exploration of Certain Sites in Culberson County, Texas, by A. T. Jackson (pp. 146–192), describes the excavation of, and the material found in two sink-hole shelters, a cave (two additional ones excavated but not described), and a burnt-rock ring-mound or midden. As all of the sites were completely excavated, the description of a single site or a more general account of all would have presented the data more clearly. Considering the significance of the sink-hole shelters, and the Southwestern pottery which they provided, it is hoped that Mr. Jackson's findings will appear in a more detailed form.

The majority of the material described is analogous to that from other West Texas caves, but is distinctive in that agriculture is lacking, and in the scarcity of stone objects. The bow and arrow seems to be contemporaneous with the atlatl.

Of greatest significance is the presence of pottery in two of the caves. The great length of time represented by the types described indicates that the sites might have been occupied for several hundred years. The absence of pottery in other cave sites in the same region, and its rather common appearance at surface sites to the east and south of the region explored, suggest that all of the sites reported by Mr. Jackson were not occupied contemporaneously.

This type of pottery normally occurs in the region at similar sites, but in some instances towards the surface only. It has also been found in open sites of a temporary nature and in more permanent village sites. Its relationship to the cave deposits is of the greatest importance. Undoubtedly the pottery is a key to the dating of at least some period in the occupation of these sites which

have some traits in common with other west Texas cave cultures. However, with the exception of pottery, few traits are comparable to those characteristic of the village sites in which the pottery types normally occur. A full discussion by Mr. Jackson of these relationships would have provided the reader with a clearer understanding of the probable age of the sites described, and their position with reference to other cave sites in Texas and to the Southwest.

Probably on account of the lack of space, no indication is given by Mr. Jackson of the controls exercised to detect cross-cutting of deposits and to identify true temporal associations of objects, regardless of their vertical or horizontal position. Any conclusion as to the association of objects would, therefore, seem tenable only when the excavator clearly demonstrated their occurrence.

More Evidence Concerning Abilene Man (Table of Contents: Late Discoveries in the Abilene Region), by Cyrus N. Ray (pp. 193–217), is a description of recent finds, and reviews those which the author previously made in central Texas, which have produced a series of approximately fifty long-headed skeletons and a great number of deeply buried artifacts.

Dr. Ray states: "It would seem that the Abilene region would be the logical place for those who seek evidences of ancient man in America to look, instead of denying that such evidence exists, as some do, and then refusing to inspect the evidence."

This reviewer is in accord with the first part of Dr. Ray's statement to the extent that central Texas is one of the several areas in which intensive investigations seem highly promising. It would seem, however, that it may not be the existence of the evidence itself, but rather Dr. Ray's interpretation of such evidence that has been denied. In a problem so involved as that of archaeological material in a geological formation, it seems that the archaeologist can, at most, locate the sites, gather the material in such a manner that its association may be determined, and arrange it in typological order. The interpretation of every problem involved calls for the services of the sedimentationist, climatologist, geologist, physiographer, palaeontologist, archaeologist, conchologist, physical anthropologist, and the like.

Dr. Ray calls attention to the fact that, in his opinion, Dr. Antevs has not given him proper credit for his discoveries. Similar complaints have been made by Dr. Ray against others in some of his recent publications. This reviewer appears to be the principal cause of these complaints, in that his name has been used in connection with that of Dr. Ray in referring to the buried sites in central Texas. It seems only just to all concerned to issue the following statement.

At the time of Dr. Ray's discoveries of the buried sites, I was also engaged in part-time investigations in central Texas, and was then acting as secretary of the Texas Society. Following Dr. Ray's finds, similar sites were found by me, and additional ones during my survey of Texas in 1931–32. In the summer of 1934, Dr. Ray cooperated with me in an investigation of the covered sites in central Texas to the extent of making available all of his information concerning

those he had found, and of putting his own sites at my disposal. These facts have already been published in my introduction to Leighton's *Geological Aspects of the Findings of Primitive Man, near Abilene, Texas,* Medallion Papers 24, August, 1936.

It is certain that no one had any intention of slighting Dr. Ray, as he has always been credited with the discovery of the buried sites in central Texas.

A Carankawa Fire Implement, by Clyde T. Reed (pp. 218–221), describes two tubular stone artifacts which he states "can only be interpreted to be fire implements. . . . They were not connected in any way with ceremonials; but, rather with the very practical business of keeping the fire of the tribal colony burning."

Similar objects have been identified in use ceremonially by recent Indians as *cloud blowers* and *sucking tubes.* The author does not state on what ground his identity was made.

Buried Middens in the Floodplain of the Little Wichita River, by Adolph Henry Witte (pp. 222–226), describes briefly four sites at which artifacts and burials have been found. His conclusion sums up the evidence of similar Texas findings and expresses the opinion of several competent observers.

"It is obvious that man occupied certain areas in the Little Wichita River floodplain during a geological period when the surface of the plain was at a much lower altitude. The evidence also shows that climatic changes followed the initial occupation, in some instances, many feet of slackwater silts were deposited upon the midden sites. Subsequent occupations of the floodplain were followed by reoccurring excessive humid conditions and additional strata of silts were deposited upon the midden sites. It is usually conceded that the climatic changes mentioned here occurred a number of thousands of years ago in the late pleistocene."

This volume is a valuable contribution to American archaeology. Dr. Ray is to be commended, not only by the members of the Society, but also by all others interested in Texas archaeology. This reviewer knows that it is largely through his efforts alone that the annual publications are issued.

The plates, in general, are clear reproductions and amply illustrate the text. The use of fewer pictures in some instances would have allowed larger and more satisfactory reproductions. It is also believed that a large part of the text pertaining to the plates alone would have been better used as plate captions, with references to them in the text when necessary. Other descriptive details might have been reduced to tables, thus retaining the information for those who desire it, but leaving the articles less encumbered with minutiae.

The publications of the Texas Society have already covered a wide range of subjects, and, in addition to the continuance of these descriptive articles, the Society might well undertake, in cooperation with other Texas groups, a closer correlation of findings.

A prehistoric cultural sequence in Texas is amply indicated by: (1) a pottery

agricultural-house-building horizon extending over large parts of Texas at the time of European discovery; (2) a pre-pottery horizon, underlying this, in many parts of the state; (3) an occupation during a period of climatic conditions different from the present. The geographic distribution of these cultural horizons suggests, in some instances, widespread comparable traits; localizations are evident, as well as other minor but significant differences indicating an extremely long cultural and chronological sequence.

It seems certain that sufficient work has now been done in Texas by various workers to begin the correlating of these investigations, even though such a correlation must remain tentative for many years. A better understanding of Texas archaeology will certainly result. Texas is, at present, the only part of the North American continent where extensive work has been done without the use of some relationship system. The relation of Texas to the Southwest, the Plains, the Mississippi Valley and Mexico is so close physically and culturally that workers in these fields will certainly welcome some such system.

E. B. SAYLES

A Jamestown Baking Oven of the Seventeenth Century. WORTH BAILEY. (William and Mary College Quarterly Historical Magazine, Vol. 17, 2d series, No. 4, pp. 495–500, 2 plates, October, 1937.)

Lime Preparation at Jamestown in the Seventeenth Century. WORTH BAILEY. (William and Mary College Quarterly Historical Magazine, Vol. 18, 2d series, No. 1, pp. 1–12, 8 plates, January, 1938.)

In these two papers, Mr. Bailey, museum technician of the Jamestown Archaeological Project, Colonial National Historical Park, has made pioneer contributions to the study of a neglected source of information: cultural materials from historic sites of white origin. Important as this work is to historians, it is of equal importance to archaeologists, since it is in outgrowth of the notable work now under way on the historic white sites of Jamestown, Williamsburg, and Yorktown, Virginia. It was only a matter of time until the cultural deposits of white origin on this continent should be studied with the same degree of care as that given sites of aboriginal origin, and it is particularly appropriate that Jamestown should have been one of the earliest subjects of this scientific study.

Aside from the colonists' food supply itself, the nature of which is indicated by materials obtained from excavation, the most intimate remains of the settlement are the domestic utensils. A clay baking oven of this class, of unusual interest, is described and illustrated in the first paper. The careful restoration of the specimen from more than two hundred fragments, which is described, indicates the caliber of the laboratory technique which Mr. Bailey has developed. Historic British parallels are cited, together with useful data on the development of the oven and of primitive pottery making in colonial Virginia. The discussion is accompanied by a plate showing specimens of the pottery recovered, some of which are lead-glazed. The author promises a special study of

this glaze, and such a study would be a contribution to the study of ceramics.

The second paper deals with the highly significant use of oyster-shell lime in masonry construction, a characteristic feature of colonial architecture of the region. Excavation of several kilns at Jamestown furnished the author with data for a thorough discussion of the preparation of lime, and this paper is as carefully documented and illustrated as the first. The author's style is most lucid and penetrating, displaying an intimate knowledge of Colonial technology, from the two sources of documentary research and laboratory examination. If the series begun with these two papers is a sample of what may be expected, there will soon be available a most remarkable apparatus for the student of Jamestown. For the worker in other fields of historical archaeology, Mr. Bailey's work is a model of accuracy, thoroughness, and logical method.

G. HUBERT SMITH

SOME RECENT PUBLICATIONS

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